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CAR ACTION

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THE WORLD'S LEADING R/C CAR MAGAZINE

June 1998

T3 vs. XXT

Inside Racing's Top Contenders



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Get the specs! — pg. 106

INTERNATIONAL RACE ACTION

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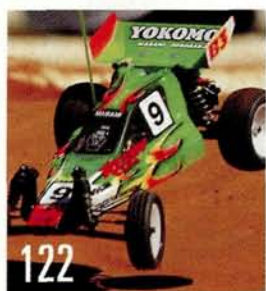
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ON THE COVER: Schumacher's potent SST 2000 '98; our Associated RC10T3 and Losi XXT 'CR' Graphite Plus get wild 'n' wooly; Cirrus's CS-80 transparent servo. (All photos by Walter Sidas.)

You talkin' to me?

"Hey, your mom wears army boots."

OK, buddy; whatever.

"Your dad's so fat, when he sits around the house, *he sits around the house.*"

Yeah, sure. Look, I'm really busy right now, OK?

"My Losi could kick your Associated's butt"

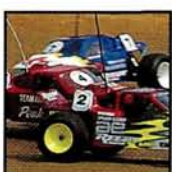
Wha—what did you say? I'LL KILL YOU!

So it goes in the world of off-road R/C racing, where fierce loyalties keep Losi and Associated drivers locked in near mortal combat. We've always argued that both companies offer great machines that can win in the hands of any driver, but is one really better in a quantifiable, hands-down, no-arguments-here decision? Find out for yourself in our **truck shootout**, in which we compare Associated's RC10T3 and Team Losi's new Double-XT 'CR' Graphite Plus. (Yes, we have the newest version of the Double-XT, so you'll definitely want to check it out.)



When you pull the body off your tricked-out race machine, you expect to hear some "Oohs" and "Ahs" over the custom graphite pieces you made and the blue-anodized aluminum parts. But when was the last time you heard someone say, "Cool servo!" Probably never. But we couldn't have R/C anything without servos, and the right servos can dramatically affect the performance of your car. We've compiled all the data on the latest units from Airtronics, Cirrus, Futaba, Hitec, Hobbico, JR and KO Propo in our comprehensive **Servo Guide**. In addition to the usual info-packed charts, we've included our trademark sidebars for that "next level" of knowledge you need to make the best buying decisions—a must-read.

We're working hard to keep the **Homebuilt Projects** coming, and this month, there's a truly impressive piece from New Jersey native John Massotto. We may as well have shot a real dragster for this article; his scale rail is just that realistic! If you have a custom vehicle that has what it takes to be spread out in full color for thousands to see, send a photo and description to us here at *R/C Car Action* (100 East Ridge, Ridgefield CT 06877-4606). Mark the envelope, "Attention Homebuilts," and we'll see what you've got!



Since this is *R/C Car Action*, action is what this issue has in spades; in addition to in-depth coverage of the **Florida WinterChamps** and the Kyosho World Championships, we also have "Thrash Tests" of Schumacher's 1998-spec SST tourer, the Traxxas Nitro Sport, Kyosho's nitro Mini Cooper and a hot oval contender from Savage Motorsports. Start turnin' these pages!

Peter Vieira

Peter Vieira
Editor

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Calling Doctor Nitro, Doctor Nitro please ...

Great "Piston Power" article in the April issue! I couldn't agree more, especially with the amount of money I paid for my .21 engine. We should call you "Doctor Nitro." Do you know what percentage of oil is in Blue Thunder? Hmm. Keep up the good work, doc. [email]
LEVI REYES

Thanks, Levi, I'm glad you found the "You have the right to know" oil-content article useful. Yes, these engines aren't cheap, and we modelers aren't stupid. We can make intelligent choices, but to do so, we need to educate ourselves with the facts. One very important fact is oil content, and the fuel makers should disclose the percentage numbers. Some already do; my hat is off to them.

To date, I don't know how much lubricant is in Blue Thunder fuel; they won't tell me, either.

Thanks for the support. Run it cool.
—CC

Please come to the Piston Parlor, Ron ...

I just finished reading your first "Piston Power" column. Congrats to you and to *R/C Car Action* for one of probably the most useful columns I've seen in a long time. I've only been into R/C for about a year. I started with electric but was soon curious about nitro and got a Nitro Stampede. Since then, my nitro collection has been growing, and my electrics are pretty much just taking up space. Good, practical info on nitro power seems hard to come by, though—at least, around here—so your column will help immensely. Anyway, on to my question ... [email]
RON

Ron's astute question involves some very important points—as did many other letters I received. Please turn to this issue's "Piston Power" column for your questions and my answers.
—CC

DIY Decals

My question is: how can I make my own decals? Let's say I could draw the design; what paper (if paper at all) would I draw it on, and how would I stick it to the body like a regular decal? Any information would be appreciated. Keep up the excellent work on the magazine.

TRAVIS WARWICK
Santee, CA

Travis, there are two types of decals: printed and cut. Printed decals are the most common; the image is literally printed onto self-adhesive film. You can buy similar material from an office supply store, art store, or sign shop; it will work with a photocopier or a laser printer. You can draw, photocopy, or print out your design from a computer onto the



sheet, then apply it like a normal decal. "Cut" decals are usually die-cut from colored vinyl, but you can cut your own by hand. A sign shop can sell you the vinyl material, or you can buy contact paper at a grocery or hardware store. Trace the design onto the vinyl, then cut it out with a hobby knife; cut only the colored part, not the backing. Once you've made all the cuts, "weed" the decal by removing all the waste material (such as the space inside letters like "o" and "p"). When you've finished, lay a strip of masking tape over the design, then lift it from the backing; the tape will hold the letters in their correct positions. Apply the decal, then gently lift off the tape. If that sounds as if it's a lot of work—it is! The best option for custom decals is the Roland Stika decal cutter and Signmate software; this device hooks up to your PC and cuts out decals exactly as you

designed them onscreen. It isn't cheap, though; prices start at \$495 (not \$49, as stated in our *Buyers' Guide* ... oops). —Greg

Newbies' Q&A

I want to get into racing 2WD, off-road buggies. I figure that the top two cars are made by Losi and Associated. Which of these two cars is better? Also, what makes an electronic speed controller good? They all appear to have the same function, but they vary widely in price range. Another question I have is about batteries: why do some packs cost more than others? Is there a difference between battery packs? And last: motors. I have heard that the lower the turn, the faster the motor. Is that true? Also, what "turn" are they talking about? For example, what does an 11-turn triple do? What's the triple for? And what is a wet magnet? I would really appreciate some answers. Thank you.

[email]
MO

Mo, your letter is like a list of beginner's top 10 questions! I know that if I help you out, I'll also be helping a bunch of other newbies, so here goes ...

- Losi or Associated, which is better ... see the shootout in this issue, starting on page 62.

- An ESC is superior to a mechanical speed controller because it requires no maintenance, offers proportional throttle control instead of "speeds" and allows you to brake the car (this is easier on your gearbox than slamming the car into reverse to stop it).

More expensive ESCs operate with greater efficiency, offer more adjustability to suit your driving style and can handle hotter motors and/or more cells (batteries). Even the least expensive ESC is light-years ahead of a mechanical job.

- More expensive batteries offer greater run time and higher voltage. The most expensive packs use "matched" cells, which ... well, just read this issue's article on matched packs (see page 138).

- A motor is identified by its turns and winds; the "turns" represent the number of times a wire is wrapped around the armature,

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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Peter Vieira: peter@airage.com
Greg Vogel: greg@airage.com

while the "winds" represent the number of strands of wire in each turn. So—to use your example—an 11-turn triple uses three strands of wire wrapped around the motor's armature 11 times. And yes, lower winds do make a motor *faster* in terms of rpm, but torque is often more important than rpm. This is a whole 'nother article ...

- Last, a wet magnet starts out as a wet paste that is molded into shape. The completed magnet is not wet at all!

Hope that helps out, Mo.

—Pete

"X" Marks the Spot

Hello, it's me again—the voice of the people. Can I address the subject of foul language? Sailor talk? Cussing? You know, swearing. I don't care what you do with your buddies in the privacy of your own car, home, or whatever, but could you please leave the Jerky Boys' stuff off the drivers' stand? Some of you guys could make Andrew Dice Clay blush. I've seen moms stroll into the shop to pick up Junior, only to hear dialogue lifted from an Eddie Murphy routine. Then Junior hears some really ugly words; words like "You're not allowed to come here any more, young man!" Think about it.

RACER X

Erratum

We goofed! When we tallied the votes for favorite body in our Top 10 Readers' Choice Awards, we failed to notice that most voters were mislabeling Protoform bodies as Pro-Line bodies. In error, we counted Protoform's Nissan GTP, Sidewinder GTX and RAMbunctious GT bodies as Pro-Line products. With that correction, now five of the top 10 bodies are by Protoform! We know you like the bodies; now you know the name.



BY CHRIS CHIANELLI

Tour de Force

TRC now offers its Ground Force Touring Series tires in two versions to cover all touring-car needs:

- Standard hex and offset for HPI, Tamiya, Kyosho, Yokomo touring cars.
- Special hex and offset for Team Losi's Street Weapon.

The tire compounds are specified by durometer readings on the package and range from softest (most traction, quickest wear) to hardest (least traction, longest wear). Use these numbers to select the compound that will help you to fine-tune your car more quickly. For more info, contact Trinity Products, 36 Meridian Rd., Edison, NJ 07036; (732) 635-1600; fax (732) 635-1640.



PRIMO PRIMERA

Here's the latest in Protoform's expanding line of sedan racing bodies. Designed to fit all the popular 190mm 4WD and FWD chassis, this new Nissan Primera is highly detailed and very sleek. It comes with an add-on spoiler, mounting hardware, window masking and detail stickers. In our most recent "Top 10" issue, Protoform took five positions in the "Top 10 Bodies" category. Had this body been available then, who knows?; it might well have been six out of 10! For more information, contact Protoform/Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781.



The Next Step

This is Cody Istock and his alcohol-burning, Raptor-powered Top Fuel Jr. Dragster. Yes; they really do race these, and Cody runs his at the Moroso Motor Sports Park in West Palm Beach, FL. Junior drivers range in age from eight to 17 years; as their skills improve, they can work their way up through the available Briggs & Stratton engines from stock units to the alcohol-burning Raptor Cody runs. Chassis frames are of tube construction in either steel or chromoly. How fast do they go?—up to 70mph! Interested? Contact the NHRA Jr. Dragster Racing League at (818) 914-4761 in Glendora, CA.

Cody, who is sponsored by the Zap glue people and Frank Tiano Enterprises, did very well for himself this past year, and we at R/C Car Action wish him luck this season.



Bolink Street Treads

Are your foam tires losing traction because of dust and fine dirt on your otherwise perfect parking-lot race site? These new rubber tires with street treads could solve that problem very nicely. Bolink has mounted and glued Pro-Line Road Hawgs on black rims for you (foam inserts installed), so they are all ready for your 1/10-scale pan car. The set includes spoked and slotted wheel-cover inserts that can be painted and that you attach to the wheel with two small screws.

Here's the best part: these tires offer long wear, and they look so much more scale than foam.

For more information, contact Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30045; (770) 963-0252; fax (770) 963-7334.



F-150 for the GT



Pro-Line's new '97 Ford F-150 was specifically

designed for the super-popular Associated GT and revised GT gas trucks. This lightweight body formed of 0.030 Lexan was carefully engineered to fit these trucks and retains the optimum in narrow race-truck-body lines for improved handling. The F-150 comes with an add-on rear spoiler and decal set. Contact Pro-Line, 201 W. Lincoln St., Banning, CA 92220; (909) 849-9781; fax (909) 849-2968.

U.S. 4-CELL INDOOR Championships

Nine Times Joel "Magic" Johnson has been crowned the **U.S. 4-Cell Indoor Champion**. No other driver has been able to win the title more than twice. In fact it would take the next six winners totals just to equal Joel's domination of this event.

The **D3** modified motors, **VIS EX-TRA** Sanyo RC-2000 battery packs and **Switch Blade 12sj** that helped Joel win his 9th title can help you win your first!



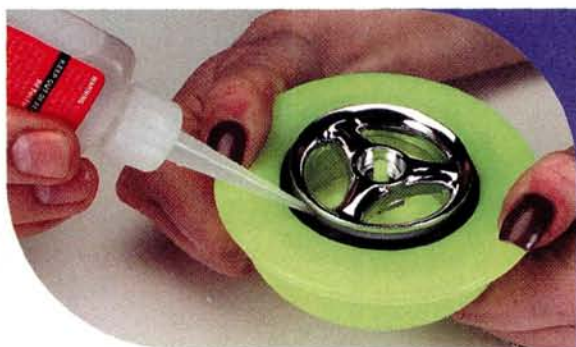
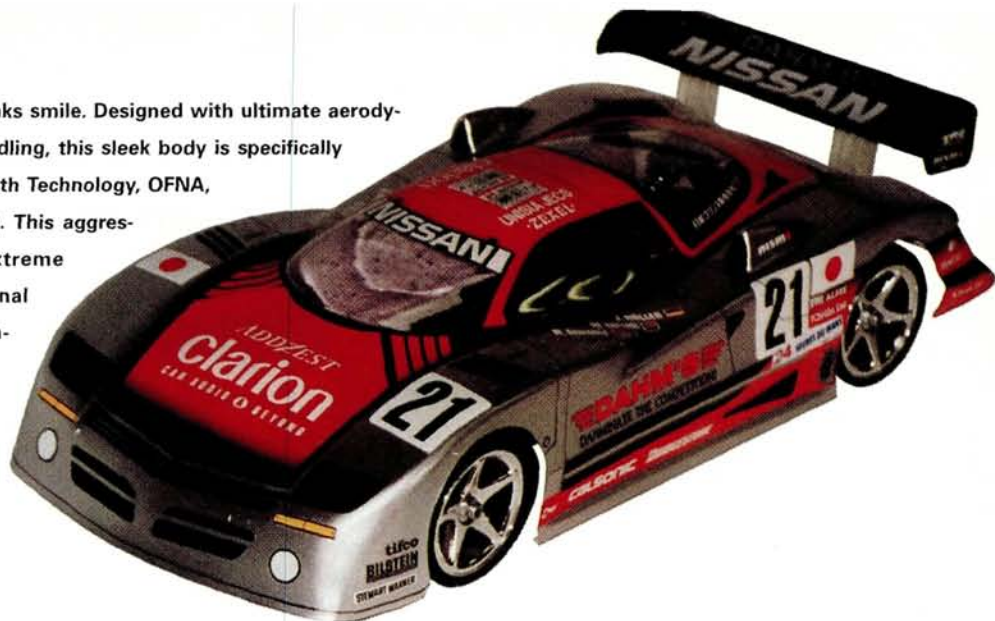
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DAHM'S NISSAN

This Nissan 390/GT1 is sure to make you GT1 freaks smile. Designed with ultimate aerodynamics and ground effects for top speed and handling, this sleek body is specifically for 190mm sedans from HPI, Tamiya, Yokomo, Tenth Technology, OFNA, Road Runner, Schumacher, Kyosho TF-2 and ABC. This aggressively styled racing coupe features: Dahm's Extreme Wing and aerodynamic mounting system; optional street-version spoiler; two cooling scoops; reinforced 3D side panels; and finishing decals. And it's available in lightweight .030 Lexan and stronger .040 Lexan versions. For more information, contact Dahm's, Dept. PR, P.O. Box 360, Cotati, CA 94931; (707) 792-1316; fax (707) 792-0137.



Glue it True

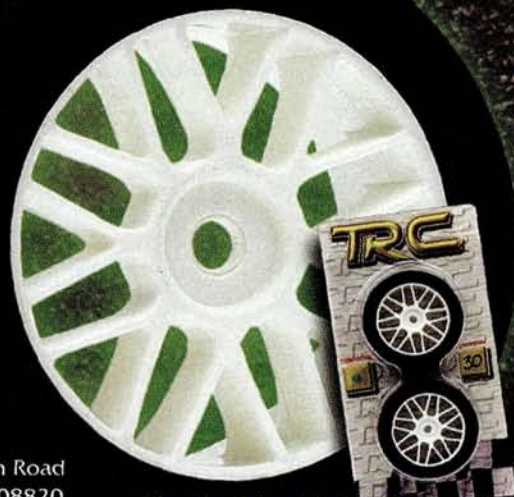
Are you tired of getting glue all over your hands and still ending up with a tire that isn't lined up correctly on the wheel? If that's you, the new Pro-Bond Tire Fixture from RPM is just what you need. With this tool, you'll be able to make clean, true, tire-to-wheel bonds in one easy step. When pressed together, the two parts of this tool uniformly break the tire bead so that the glue can be applied evenly in one pass. When the tool is released, the bead seats uniformly on the wheel for a perfect fit. Remember this, guys: your suspension, no matter how expensive or how bright its color, can't do a thing for your car's handling if your tires don't run true. For more information, contact RPM Custom Engineering R.C. Products, 14978 Sierra Bonita Ln., Chino, CA 91710; (909) 393-0366; fax (909) 393-0465.

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Standard Models Available
To Fit HPI, Tamiya, Kyosho
Yokomo, Schumacher Etc.

PROTO SPORTS



Kyosho's wild new Proto Sport is based on their 4WD, Formula 10 chassis. Like the Formula 10, the Proto features: four-wheel independent upper and lower A-arm suspension; adjustable front caster and camber; triple-belt drive train; internal-spring oil-filled plastic shocks; flip-top 75cc tank (lower, for better center of gravity); full 16-piece ball-bearing set; disk brakes; adjustable tie-rods; adjustable rear camber; 2.5mm-aluminum chassis; aluminum upper radio plate; front and rear gear dif-

ferentials; fiber-filled plastic parts for extra strength; and new, low-power-loss muffler. Like the Formula 10 and Nostalgic Series, the Proto comes with the GS-11R pull-start engine. For more information, contact Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300.



Pentagon

Here's a manufacturer you may not be familiar with. Pentagon produces a heavy-duty lineup of axles for a variety of cars. These precision-machined, chrome plated, lightweight "uni's" are extremely strong, and that's not all: they also come with spacing shims, O-ring pins and a hex wrench for disassembly. Next in line are Pentagon's shocks. These smooth little purple and silver beauties would be an excellent addition to anyone's car. They're available with a set of pistons and come with purple O-rings and bladders and a cool Pentagon logo on the cap. Just add oil and springs. Not enough colors on your car? Pentagon also offers shock bladders and O-rings in many colors. Now, if Pentagon could only get a U.S. distributor Hey; if there's anyone

out there looking for some hot new products, here they are. Powers, Japan Office, The Hit Corp., 29-16 Yashio 7-chome, Yashio, Saitama, 340-0815, Japan; phone +81 (0)489 98-5438; fax +81 (0)489 98-5455.

Nitro TAO2

Thanks to Thunder Tiger, all those trusty Tamiya TAO2s out there can now be converted to nitro power. Thunder Tiger engines are quickly establishing a reputation for reliability and power, and this Tamiya/Thunder Tiger hybrid could prove to be a formidable team on the nitro-sedan racing scene. The Conversion Kit includes: double-deck aluminum chassis, all necessary hardware, fuel tank, Thunder Tiger engine (both .12- and .15-class size available), header, tuned pipe, flywheel, two-shoe clutch, dual belt-drive train, full ball bearings, disk brake and front and rear transmissions. I will investigate this one further for you guys—personally! Price has not yet been finalized.



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to *R/C Car Action*, or an extension of your existing subscription. You'll also be eligible for the eighth annual "Readers' Rides of the Year Contest" in the fall of 1998. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!



Pool Party

David Burila of Manteca, CA, shows off his cars poolside. The truck is a Losi GTX equipped with an O.S. CV engine, Lunsford tie rods and a pair of Hitec 605MG servos. The HPI F-1 uses a Futaba 132H servo, Novak NER2FM receiver, Novak Hammer Pro speed control and Pro-Line tires. The Superior Spectre oval car incorporates a JR mini servo, Novak Cyclone ESC and Mercury receiver. The pod and rear hubs are also made by Superior. Nice vehicles, David; just remember: water and electrics don't mix!

Terrible Twos

David Harrington of Phoenix, AZ, shows off his Losi XXT racetruck, which he uses primarily for racing, while his Traxxas Stampede is just for play in the backyard. The XXT uses a Novak Racer, Trinity Midnight motor, Team Orion batteries and, of course, a full set of ball bearings. The truck also uses Pro-Line Fuzzie T tires in the rear and is topped off with a Chezzoom teal and Le Mans pink Dahm's Buggy body. The Stampede has an Airtronics Rival radio, Tekin Rebel speed control, Motor Man 1500mAh pack and Trinity Ruby motor and is finished in the same colors.



Speed Racer's Backups

When the Mach 5 was sabotaged, there was only one thing Speed could do: hop into his choice of an Associated T2 or HPI RS4 Pro. Ron Spaulding of Plainfield, IL, has brought the Mach 5 into the '90s with his HPI Porsche (complete with detailed interior) and HPI Ram-bodied T2. Both vehicles use Tekin 411G2 speed controls. The T2 features lightweight diff hubs and top shaft from Hammad Ghuman, Pro-Line tires and Technacraft titanium turnbuckles.

Perfect 10 (10L, that is)

Glenn Cauley of Gloucester, Ontario, Canada, has an anything-but-stock Associated RC10L pan car. He decked it out with a chassis from Composite Craft, Technacraft damper post, Hammad Ghuman left-side motor plate, BME fiberglass axle, Cheetah ProFlex suspension and more. Glenn uses TRC Green compound tires and tops the car off with one of three bodies—Porsche 911, Dahm's Jaguar, or Dahm's WWSC Spice, as seen here. Glenn says the car handles as if it were on rails.



Doin' the Dew

Drink too much soda? Brandon Vessels of Ft. Irwin, CA, does, and it's clear Mountain Dew is his number-one choice. The Nitro RS4 truck has a 15SS engine with tuned pipe and gets up to speed with the 2-speed tranny. Brandon also equipped the truck with a full ball-bearing kit and swaybars, and an HPI Ram body tops it off. His boat is custom-built and uses a 22.5cc Zenoah engine. A Futaba 3PDF radio keeps Brandon's vehicles under total control.



High-Riding Hummer

Dale Rister of Azle, TX, started with a Tamiya Clod Buster and finished with a Hummer. The chassis is an ESP Clodzilla 3 with stock Clod, gear fitted with a set of Boca's bearings. Bumps and jumps are soaked up by Kyosho platinum shocks with Losi red springs, and the electronics include a Futaba radio, Sanyo battery and a Tekin Titan speed control. Sees aluminum rims are on all four corners, and the truck is finished with a custom-painted Tamiya Hummer body. Dale calls it the "Humzilla 3."

Purple Pirate

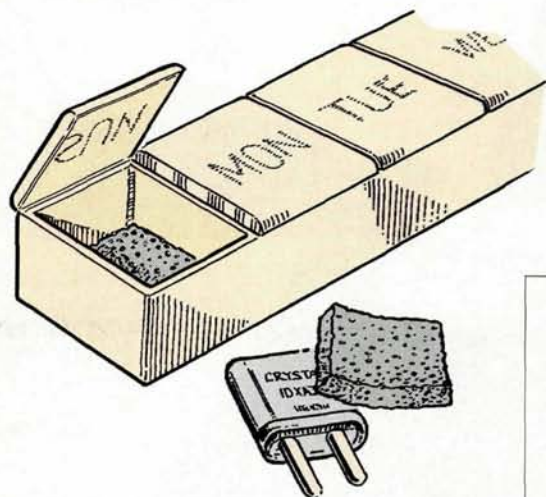
Mark Wood of Des Moines, IA, sent this picture of his OFNA Pirate 10 to it show off before it gets caked in dirt. The car is equipped with a Futaba radio system and an O.S. .12 CZ-Z engine with MIP heat-sink head. Mark also fitted the car with Losi rims and Pro-Line tires. He had the body painted by Haywire. Nice work, Mark; it looks like a fast 4-wheel-drive buggy.



4WD Truck Racer

Rick Tapp of Omaha, NE, is the first to send us a picture of an HPI RS4 MT. In addition to the custom paint job, Rick has slightly modified the truck by adding a 2-speed transmission. He uses a Peak EBX 12-turn motor, a Tekin Titan speed control fitted with Deans connectors and a Futaba Magnum Junior radio for control. He replaced the stock treads with beefy Pro-Line Dirt Paw tires.





Crystal Clear

Store your spare crystals in one of those clear, plastic, seven-day pill containers with the flip-top sides. To protect the crystal from damage, line the inside with foam rubber.

JAMES PERRIN

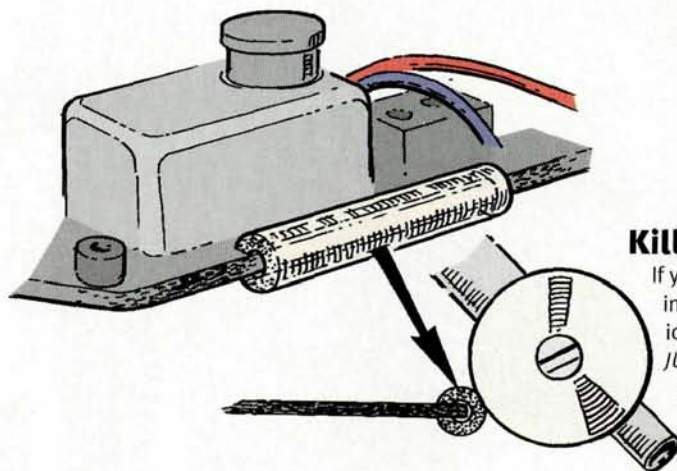
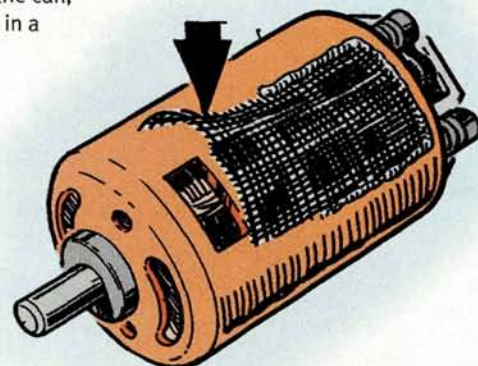
Pullman, MI

Grilled Motors

If your motor has vent slots in the side of the can, use high-temperature RTV silicone to glue in a piece of fine-mesh, glass-fiber window screen over the holes to keep out small stones that can damage the motor.

JAMES BOURKE

St. Heliers, Auckland, New Zealand



Kill Bad Vibes

If your muffler vibrates against the chassis, cut a piece of rubber fuel tubing, slit it along one side, then glue it to the chassis' edge. This will cushion the muffler and prevent it from being scored by the vibrating pan.

JUAN MARTIN LORA

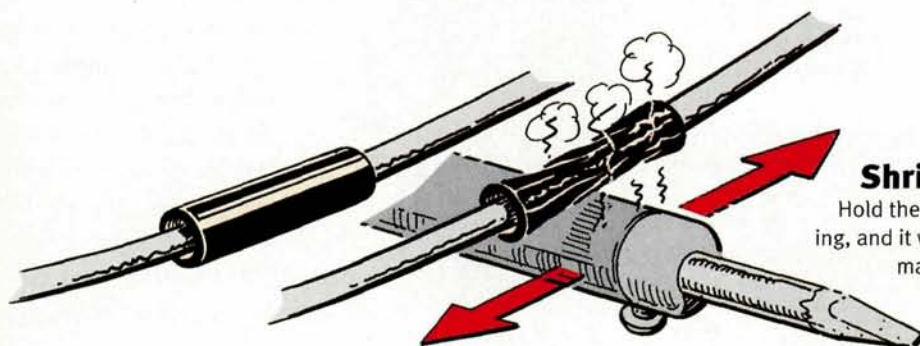
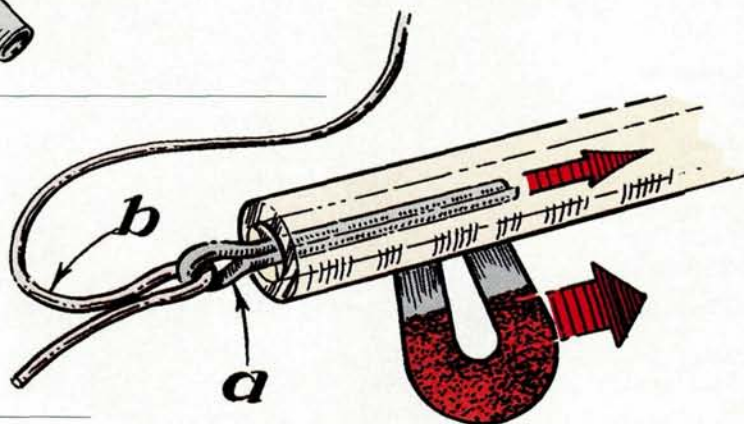
Cali, Colombia

Magnetic Touch

Fold a paper clip (a) or use a steel cotter pin to grip your antenna wire (b). Push it into the antenna straw, then slowly slide a magnet along the outside to draw the paper clip up the tube, thus pulling the antenna wire with it.

MARQUES PRASS

Quebec, Canada



Shrink Session

Hold the body of your hot soldering iron close to the shrink tubing, and it will shrink tight without the burning you often get with a match. It helps to grip the iron handle gently in a vise while you use both hands to rotate the tubing over it.

LUKE FAILLA

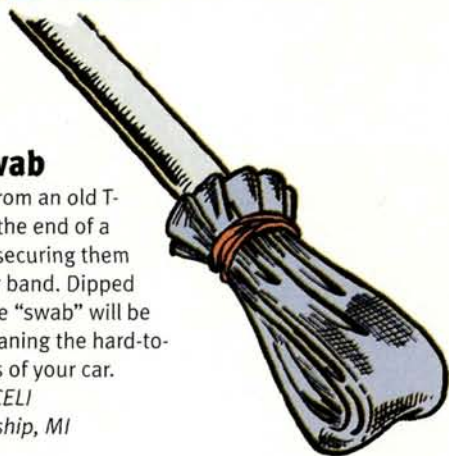
Merlin, OR

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.

Little Swab

Wrap strips from an old T-shirt around the end of a screwdriver, securing them with a rubber band. Dipped in solvent, the "swab" will be handy for cleaning the hard-to-reach corners of your car.

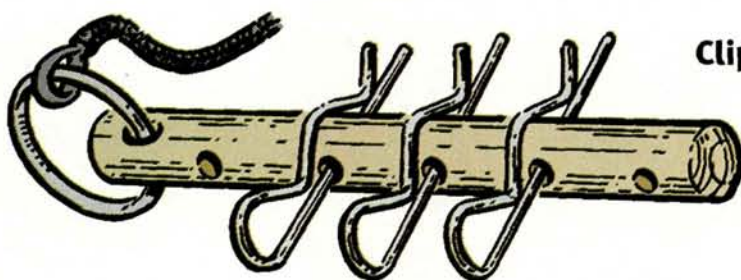
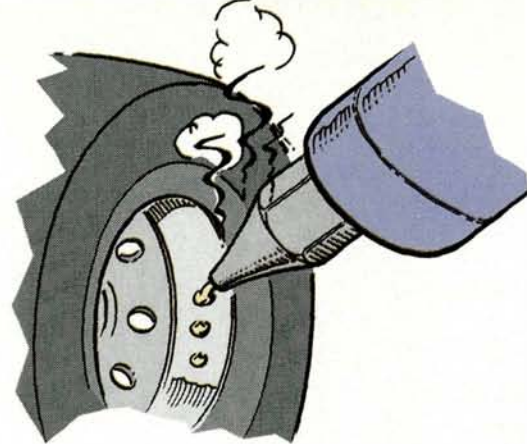
DAVID CASACELI
Shelby Township, MI



Hot Spots

To balance your wheels, use small spots of hot glue on the inner edge of your wheel rims. Final balancing is achieved by slicing little bits off the glue spots with a sharp knife. Unlike balancing tape, which sometimes comes off, these glue spots will stay put.

MARTIN BLAIS
Stanton, CA



Clip Caddy

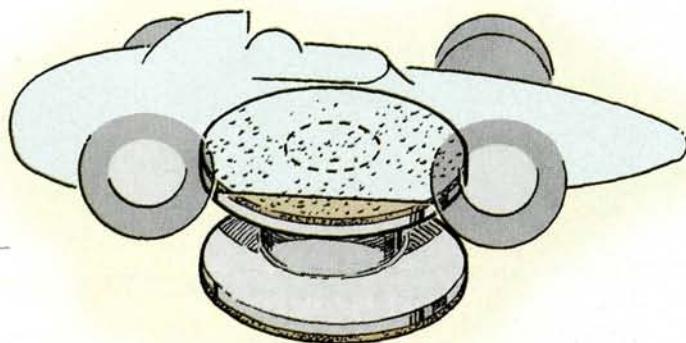
Clip your spare body clips to an old body mount or to a drilled wood or plastic dowel. Why not also attach a key ring and hang it on your belt where it will be handy?

BARRY PALACIOS
Hoboken, NJ

Spooled Up

Get an empty wire spool from your local hardware or electronics store, face the top and bottom with thin rubber or cork, and you will have a neat car stand.

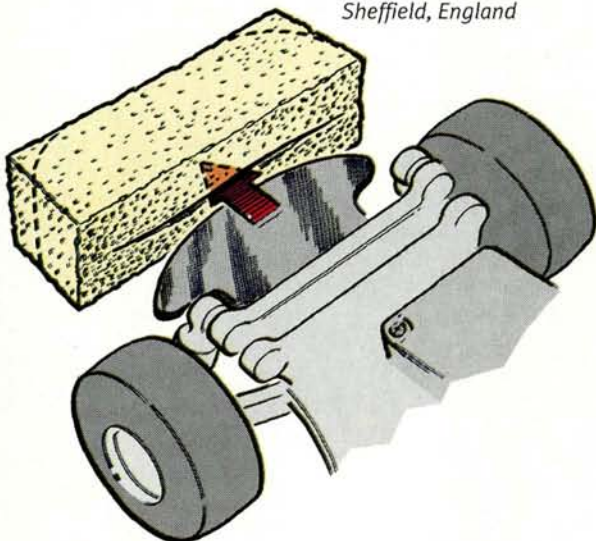
TYLER MARTIN
Yorktown, IN



Foam Bumper

Make your own bumper from fairly firm sponge foam. Slit it with a razor blade, glue it to the existing bumper, then trim to shape. An upholsterer will have lots of scraps.

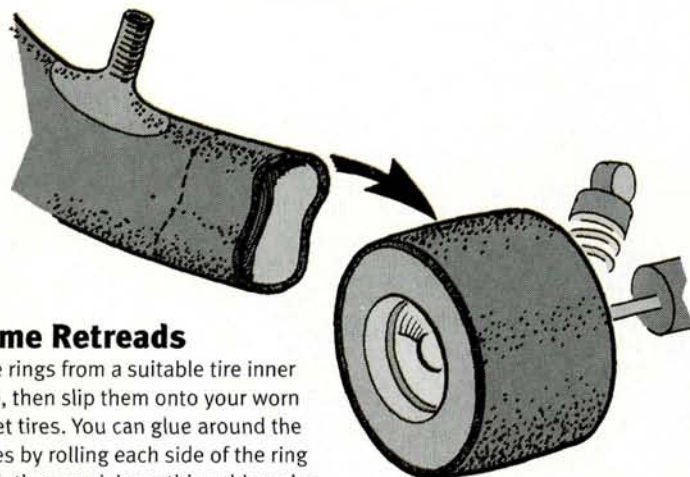
WILLIAM HOUSE
Sheffield, England



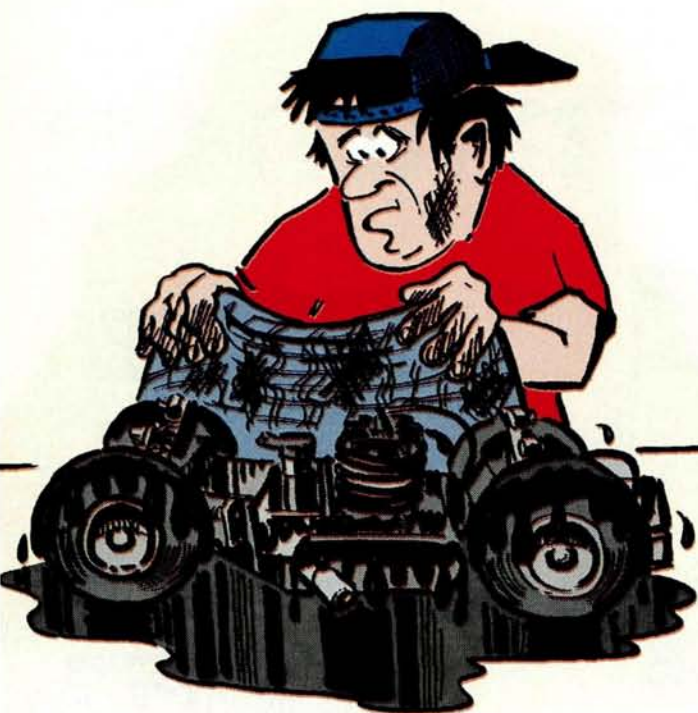
Home Retreads

Slice rings from a suitable tire inner tube, then slip them onto your worn street tires. You can glue around the edges by rolling each side of the ring back, then applying a thin rubber glue. Don't forget to check the balance afterwards.

MARK BAUTISTA
Germantown, TN



If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.



Slippery Hawk

I read your mag all the time. I'm having a problem with my Traxxas Nitro Hawk and its Image engine. After I drive my truck, there's oil residue all over the right side of the chassis. I'm pretty sure that this oil is coming out of the bearing where the crank exits the case. Is this possible, and can it be fixed? I'm new to this gas thing, so please help me out. Thanks a lot.
KIRK REED
Loveland, OH

Kirk, welcome to the wonderful world of gas trucks! Unfortunately, fuel and exhaust residues combine with fine dust to make a coating that's difficult to remove. Since most nitro fuel is mixed with castor oil, it's also super sticky, especially once it has dried. There are ways to remove this stuff once you've pulled out the electronic gear

(WD-40 and Simple Green work well), but anything you can do to stop the fuel/oil mix from seeping out of the motor will make that chore much easier. To stop the leakage around the crankshaft, tear the motor down and replace the front crank bearing with a high-quality sealed unit from Boca Bearing (see Boca's ad in this issue). You should also check for leakage around the exhaust manifold or muffler, and use high-temperature RTV to seal any leaks you find there. You'll save yourself some cleaning time and, as a bonus, you should also notice better performance.

Screamin' B2

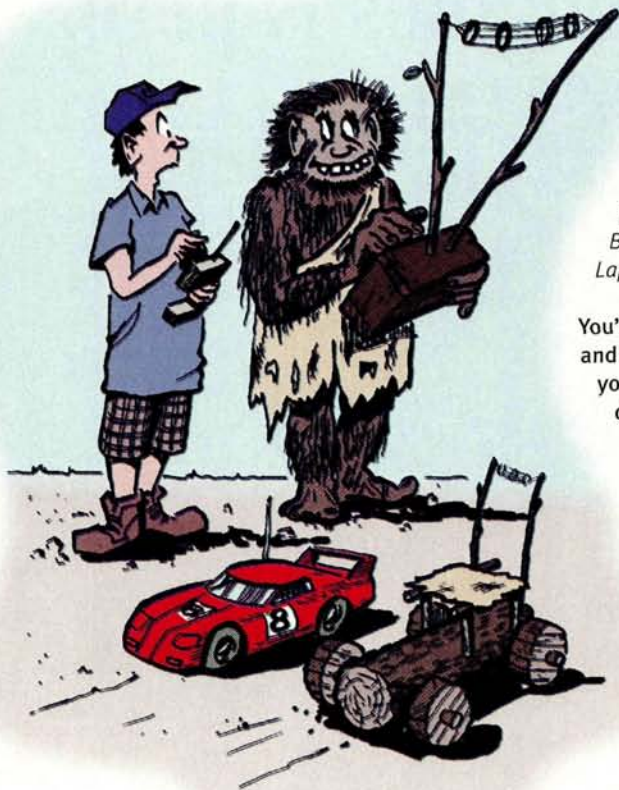
To the Great Minds at *R/C Car Action*: I have an Associated RC10B2 that worked great for about a month and a half. Then it began to sound as if the gears were stripping when I started from a dead stop. I looked at the car for a few minutes right after I heard this and saw that the negative motor wire was loose. I re-soldered it, but the problem was still there. Later that week, I took the Stealth transmission and diff apart to see if the gears really were stripped, but they looked fine. Can you guys help me figure out what the problem is?

JACOB WENNER
St. Louis Park, MN

From my experience with ball diff-equipped buggies like your B2, I'm guessing that when you take off from a stop, it sounds as if the car is screaming "GAAAACK!" No, this doesn't mean that a duck is trapped inside the tranny, but it does mean that the diff needs to be a little tighter. The Stealth diff needs to be set tight enough to prevent it from slipping under acceleration (that's what the slipper clutch is for), but loose enough to ensure good differential action. Start by taking everything apart again, and pull the diff assembly out of the tranny. Take the diff apart and look for grooves worn in the diff rings; if they're grooved, flip them over or buy new ones. While it's apart, I would replace the small diff balls as well because they might be flat-spotted. I would also use a new lock-nut on the diff-adjustment screw. Follow the directions to adjust the diff and check it by putting a thin Allen wrench through each outdrive slot. While holding the wrenches to prevent the outdrives from turning, try to turn the diff gear. If you can, tighten it down just a little bit more and re-check. Do this until you cannot turn the diff gear and then put everything back together. Your weird sound should be gone!



Why is it whinin'?



I have Tamiya Midnight Pumpkin and Kyosho Tracker trucks. My electrical equipment includes a Futaba radio and servo, MC210B speed control, Trinity Ex-Tech 1700 battery pack and the stock motor in the Pumpkin and a Kyosho Magnetic Mayhem motor in the Tracker. My Pumpkin with the kit motor is faster than the Tracker. Why is that? The Pumpkin's transmission also whines more than the Tracker's. I thought the gears were slipping, but when I took everything apart, the gears looked fine. Any ideas?

BILL GOUGH
Lapeer, MI

You've got to love the Midnight Pumpkin—it has been around since the R/C "Stone Age" and it just keeps goin'! However, it doesn't surprise me that the Pumpkin is faster than your Tracker. Not only is it lighter, but my guess is that the gearing is perfect for the closed-endbell stock motor that came with the kit (you could even put a mild modified motor in there with the same pinion). On the other hand, the Tracker is probably undergeared. With their recreational kits, manufacturers typically use a smaller pinion gear to ensure long run times, but it sounds as if you're interested in maximum performance. I'd buy a new pinion—one that's two teeth larger—for the Tracker, and see whether that makes a difference. Check the motor after a minute or two (no longer!) to see if it's getting too hot; if you can't keep your finger on the can for more than a second or two, things aren't right. That's when it's time to check the tranny and drive train very closely to see if some sort of binding is making the motor work too hard. Your Pumpkin's whining might well be caused by a motor that needs to be lubricated. As the motor heats up, the clearances in the drive shaft bushings go away and the bushings start to stick and gall. A couple of drops of motor oil on each bushing should do the trick nicely. If the motor still whines but the gears are in good shape, clean off any existing grease and put a little Aero-Car gear-diff lube (the thick, pink, pasty stuff) on them to reduce clearances and coat the surface. That should quiet things down.

One-armed bandit

I've had an Associated RC10 Championship Edition for about a year now, but I wasn't able to use it for a while due to some front-end damage. I recently replaced all of the broken parts with new stock ones, and everything works fine except for the front suspension. The A-arms move freely, and I just replaced the shock oil, but when I pick up the car and lift a front wheel, it returns only halfway. At first, I thought the A-arm was stuck, but when I took the shocks off, everything moved more freely. It does this with both front shocks, but the back ones are fine. What should I do?

JEREMY LAROWE
Deltona, FL



Sorry to hear that you weren't able to use your Champ Edition for a while, Jeremy.

The good news is that you can fix this problem without spending another nickel. The culprits here are probably the locknuts on the shock tower that retain the upper ends of the shocks. The lower ends ride in steel bushings that are captured by the suspension arm and held in place by a 4-40 socket screw, but the upper ends have soft nylon bushings that ride on 4-40 screws secured to the tower. Even when using small washers under the locknuts, it's very easy to tighten them too much. That

deforms the nylon bushing, causing it to expand and lock down the upper end of the shock absorber—so much so that it impedes the smooth movement of the entire front suspension. Simply back off the upper locknuts a turn or so, and you should find that your new suspension pieces work like a charm. If that doesn't do it, check the shock shafts; the accident that broke your car's front end may have bent the shafts, causing them to bind. Good luck, and happy racing!

What I've Learned from Spec Racing

Part II: track setups

Several months ago in this column, I described how I assembled a TRC* Street Spec kit and did a baseline chassis setup on the bench in my secret underground laboratory. After writing that column, I took my Lumina-bodied Specster to a local indoor track many times for a series of shakedown runs. I raced against a couple of friendly competitors with whom I also bang wheels in weekly F1 club gatherings (they had accumulated a variety of Trinity and TRC chassis after hearing about my Spec kit). First I won; then they won; and then the racing started to get really close as we began to figure out what worked and what didn't. Eventually, we started talking about the setup options we had tried, and this is what we found out:

TIRE COMPOUNDS

Although there are only two rear and three front Spec tire compounds available, they provide a wide range of handling options, especially when combined with a traction-enhancing product such as Trinity's* Zip Grip. Even pro-level racers agree that tires make the single most dramatic handling change to a pan car's performance, so they're the first things you should look at when you're trying to lower your lap times or correct a handling deficiency.

We all felt that Blue-compound rears, even when fully treated with Zip Grip, fell a little short of providing satisfactory traction on the track's normally high-grip carpeted roadcourse. Similarly treated Greens, on the other hand, proved stickier than necessary and gave us understeer that made it nearly impossible to get around the tight, twisting, 1/12-scale-type corners. Our solution was to use the Green-compound tires, but to sauce only the inner or outer half of the tread width. We wound up with just the right amount of rear-end "stick" and banished that annoying push.

Up front, it was a different story, as Blues seemed the order of the day. We treated just the inner 1/4 inch of the tire's gray section (always start at the inside and work your way across the full width as needed) and had sure-footed steering through each heat and main.



They might not look any different to the casual observer, but the different diameters shown on these tires allow stagger and roll-out to be altered (see text).

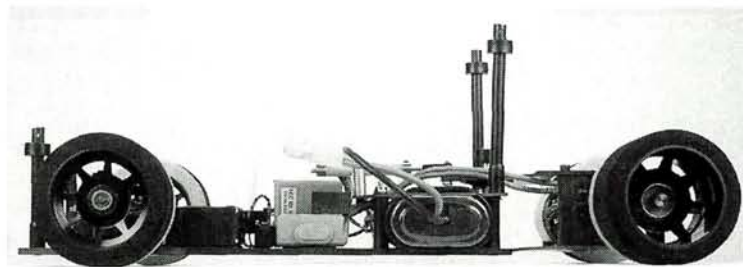
TIRE DIAMETER AND RIDE HEIGHT

The first time I ran my Spec car, it seemed plenty fast—until another guy zipped past me on the straight! I was curious about his power advantage, and he let me take a look at his car. He had the correct motor and battery, a legal speed control and *smaller* rear tires. It seems the Spec-series motor is overgeared on small, tight tracks where you're using full-size tires. While the kit's tires and gearing produce a 44mm rollout that would be perfect for larger tracks with long straights, I found that using a tire truer to reduce the tire diameter from 60 to 55mm got the motor into its power-band faster; the car also.

I also found that adding a little stagger to the tires resulted in big handling differences on the oval. Having smaller tires on the left side increased steering and made the car roll better through the turns; on other tracks, a little reverse stagger (smaller tires on the outside) kept the car from feeling too loose. Experiment!

It's a good idea to get the ride height as low and as close to level as possible without the chassis' bottoming out on the track. A low chassis allows higher cornering speeds, and maintaining momentum through the corners is what Spec-class racing is all about!

Try to keep your car as low and level as possible without its scraping the track.



DAMPER FLUID AND SPRING TENSION

Once you're in the ballpark on tires, this adjustment should be your next stop. Since tweak screws aren't legal on spec cars, your only options to control the movement of the rear pod are to alter:

- the tightness of the T-bar mounting screws (the ones that go through the O-rings),
- the tension of the damper puck springs, or
- the thickness and "stickiness" of the fluid used on the damper pucks.

It's critical to pay attention to damping action. On all Spec cars, I recommend

that you concentrate on the damping pucks. I've never endorsed loosening the T-bar mounting screws any more than is absolutely necessary because that can quickly lead to sloppy handling. I usually tighten both screws to the point at which the T-bar is firmly secured and won't wiggle back and forth. On the other hand, a little experimenting with damping fluid and puck tension can help eliminate rear-pod chatter and other undesirable handling traits.

Think of damping fluid as a way to slow the pod's

movement. There are two components to this action:

- how much the pod *initially resists being moved* (determined by the stickiness of the fluid), and
- how much the pod *resists continued movement* (determined by the fluid's viscosity).

On a low-traction surface such as unprepared asphalt or concrete, a non-sticky low-viscosity shock fluid such as 20 to 30WT oil or comm drops seems to work very well. The same car on a high-traction carpet track or a sugar-

water-treated parking lot will do much better with something stickier like Losi's* Hydra Drive fluid or Bolink's* Mega thick silicone—especially with a little more tension on the damper-puck springs. The thicker stuff prevents the pod from rolling toward the outside wheel (this can lead to tire chunking) and stops the inside wheel from lifting in hard, sharp turns. Trinity's new "Stuff"—a graduated-viscosity line of pastes—offers enough range to satisfy even the most demanding tuner.



In addition to damper plate adjustments, the tightness of the T-plate screws can dramatically affect handling.

FRONT END

I've been racing pan cars for almost a decade, and my collection of teeny-weeny front springs gives me many tuning options. Cars and driving styles aren't all alike, but I've found that thicker, fairly firm front springs (.019-inch to .022-inch range) suit my driving style. Springs like these help control body roll, and that's especially critical in narrow Spec cars, on which rear swaybars aren't permitted. Associated*, Trinity, Wolfe Motorsports*, BRP* and many other companies provide the astute tuner with plenty of aftermarket spring options, and they're stocked by most hobby stores.

I've found that the longer, cone-shaped color-coded springs work well on the TRC chassis because they're the proper length. They don't require any preload washers, and they don't sag with hard use. Their colors also eliminate the need to match springs by measuring spring-wire diameter

with a set of highly accurate digital calipers. On a new track, I usually start with red springs (above mid-range in firmness), but I'll go up to a green or purple set if the track surface warrants it. For a bumpy outdoor parking lot, I may consider moving down to thinner (less firm) blue or white springs, but I'll also slow the kingpin action by smearing some Trinity Purple Stuff or thick silicone on the kingpins. This is one area in which the Trinity and Bolink cars have an advantage: on their front ends, the entire steering spindle floats on the kingpin, and this offers a greater swept area for the damping fluid to do its job.

On an oval course, I experiment with front-wheel springs. Sometimes, a harder right front spring will do the trick; on some short, flat, "bullring" ovals, however, a right front spring that's slightly softer than the left one will make the car handle perfectly.



ALUMINUM LEFT HUB

If your car is equipped with a plastic left hub, replace it with an aluminum model. It's spec-legal, runs truer and is more durable.

If you're the proud owner of an early Trinity or Bolink kit, you probably run it with the original plastic left-side hub. Be advised that 1997 Spec rule updates allow you to upgrade to the newly released aluminum left hub that's now included in all Trinity and TRC kits. The aluminum hubs run more true, wobble less, are less likely to strip and will survive impacts with walls much better than their plastic brethren. This is an inexpensive upgrade that could easily make the difference between a win and a DNF.

FRONT BEARINGS

If your pocket can take the hit, scoot down to the nearest hobby shop and get yourself four front-wheel bearings. You will be repaid with lower lap times and longer runs. A good set of bearings will also do a better job of accurately maintaining wheel and axle clearance and will eliminate the chance of the dreaded wheel wobble that bushing-equipped cars eventually develop. You can't get a better deal for 10 bucks!



Adding diff bearings to the diff hub will improve diff action and reduce friction.

IT'S ALL IN THE DIFF

Experienced racers know that differential action has a critical effect on their car's ability to run smoothly through the turns. It's a good idea to periodically clean and lube the diff balls inside the spur gear, and do the same for the thrust bearing and polished washers at the end of the axle. The rules permit the installation of two $\frac{1}{4} \times \frac{3}{8}$ -inch bearings in the differential side hub, and I strongly recommend this upgrade. These bearings will align the diff hub much more precisely than the kit's bushings and will give substantially smoother differential action.

MOTOR TIPS

Because Street Spec rules forbid most common, stock-motor tuning methods (you can't swap springs, cut brushes, or true the commutator), there isn't a whole lot you can do beyond breaking in the brushes well and increasing spring tension by bending the spring legs as much as possible. People who have run these motors for a long time say that they get better and better as the brushes seat fully. Dave Carpenter, one of Trinity's hotshoes, says that a really well-broken-in spec motor will have a groove worn in its comm by the brushes. Yeow! You should also consider using Trinity's Formula 96



comm drops as you run your motor and break it in. According to Dave, it keeps the copper on the commutator nice and shiny and increases motor speed.

To make your motor last longer, you can also install a small spacer on the shaft between the pinion and the motor can. It will prevent the armature from knocking the endbell in an impact.

Put a small spacer between the pinion and the motor can; if the pinion gets whacked, the spacer will prevent the endbell from popping off your motor.

This is such a good idea that I install these spacers on every motor I race with. I haven't lost a single motor to a popped endbell since I started doing this!

BODY STYLES

I've tried car and truck bodies on my TRC chassis, and I prefer the short-track stock-car bodies on roadcourses (lower center of gravity; less prone to flipping; more steering response), and the pickup bodies for oval racing. The trucks' blunt noses seem to diminish steering response and smooth things out at high speed, and the small spoiler lip that most drivers run at the end of the pickup bed can also be raised or lowered to fine-tune handling.

**Addresses are listed alphabetically in the Index of Manufacturers on page 201.*

Power Mail

The response to "Piston Power" has been very gratifying. In fact, I've enjoyed reading your letters and comments on it so much that this month, I deal with questions from two readers, the first of whom has part of his letter printed in the "Readers Write" section of this issue.

Ron Balewski emails:

My question concerns engine temp. One of the first accessories I got was an MIP temp gauge, and I've found it such a useful gadget. MIP claims that optimum engine temp should be something like 210 to 230 degrees. My Stampede (Traxxas TRX .15 Pro engine) and Inferno 10 (O.S. .12), when properly adjusted, start to "sing" at around 150 to 160 degrees, and by the time they get to about 200 degrees, they're running beautifully.

I have a couple of other vehicles (Sandmaster and Dodge Ram) that use Kyosho engines. These engines don't even start to smooth out until the temp gets to around 230 degrees, and I really don't know where their optimum performance is. I'm afraid to run them any hotter. Is it possible that Kyosho engines are designed to run hotter, or do they just run unevenly?

I haven't been able to find any useful info on engine temp other than the little sheet included with the MIP gauge, so whatever you've come up with through research or experience would be most helpful. Gee, it might even make a good column.

Whatever you do, DO NOT RUN IT ANY HOTTER!! Many things will affect running temp; the weather and nitro or oil content in the fuel are just two. When I say "weather," most of you will think "air temperature," but humidity also has a direct effect on engines that burn alcohol. High relative humidity will make glow engines run hotter. Was the weather noticeably different when you ran these various engines?

My best guess is that the two engines that ran cooler—the Traxxas TRX and the Inferno Pro—had tuned pipes or tuned mufflers, and the Sandmaster and the Dodge Ram had those cruddy little expansion-chamber mufflers I hate so much. Just breathe through a 1/2-inch tube and then

BLESS THE MESS

Ken Wester, of Nashua, NH, writes:

I recently took the plunge into the world of gas power with the purchase of Kyosho's Baja Beetle. I have been running an electric R/C car for about eight years now, but I have no experience at all with glow-powered vehicles.

Here's my problem: I can't get the engine to run without stalling unless I run it very rich.

Before I started the GS-11x for the first time, I followed the instructions and broke it in as specified there. As I was closing the needle, I expected the performance to get better, but it got worse. I was getting less oil and gas at the exhaust pipe and on the engine, but the engine still stalled. After the fifth tankful, I closed the needle another 1/2 turn, but then the engine would hardly run at all. It

idled great, but had no power and would stall easily. I could only get the car to run by opening the needle valve almost to the original pre-break-in setting.

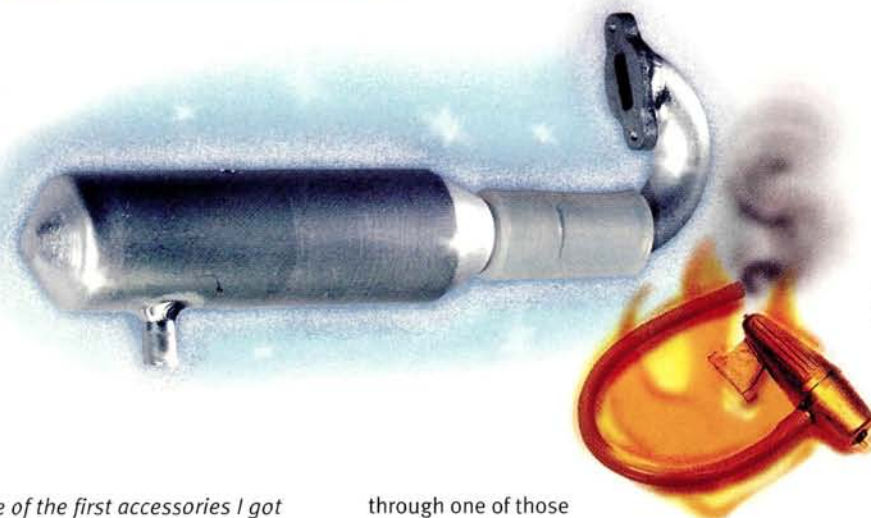
The engine seems to run great with the needle opened 1 5/6 turns. With this setting, I was able to use it for hours and had a blast, although the engine did get very messy. There was oil and fuel everywhere.

Am I doing something

wrong or something right? The instructions lead me to believe the needle should be open about 1 1/2 turns after break-in, but the engine just won't run like that. I don't want to give up on gas power. For the first time in eight years, I was able to have fun for more than 15 minutes in one day.

Adjust an engine for optimum running. There are far too many variables—

temperature, humidity, elevation and fuel blend, just to name a few—for us to adhere strictly to the instructions. The manufacturers' recommendations should be viewed only as good starting points for needle settings. Also, you can have two identical engines side by side, and one might run great at 1 1/2 turns open and the other at 1 5/6 or 1 3/4 turns open. This is due to acceptable leeways



Left: This is the excellent tuned pipe/muffler and header manifold system that comes standard with the RC10-GT.

Thanks Associated. Below: Your engine shouldn't even be run with this contraption attached to it.

through one of those skinny little bar straws. That will give you some idea of the difference between a tuned pipe and those nasty little expansion-chamber mufflers with their long, restrictive extension tubes. Induced backpressure from a restrictive exhaust system is only part of the "heat build-up" picture.

Tuned pipes not only give your engine superior, smooth performance, but they do it while also making your engine run cooler! Who could ask for more? These pipes are "tuned" because they actually resonate like a musical instrument. When the pipe is properly tuned, a "standing wave" within it resonates in harmony with the opening and closing of the exhaust port. This wave pulse is actually on its way away from the exhaust port as the port opens, and it helps to extract the hot combustion gases from the combustion chamber. (This is why tuned pipes are often referred to as "extractors.") In the process, a new fuel charge is also assisted out of the crankcase and into the combustion chamber. When the pipe is properly tuned in length, this "standing wave" then moves back toward the exhaust port at just the right time—before the exhaust port completely closes again—and that helps prevent too much of the fresh fuel charge from escaping into the tuned pipe. In short, a tuned pipe helps your engine breathe better for improved performance and breathe more easily for improved cooling—kind of like a dog panting to keep itself cool. Trust me, the best investment a piston racer can make is in a good tuned pipe.

As for those nasty little expansion-chamber mufflers, they do serve as excellent key fobs and fishing lures, but don't run them on your expensive engines.

PISTON POWER

in manufacturing and machining tolerances within the carburetor's needle-valve assembly. This is especially true of less expensive engines.

If your engine runs great at 15/6 turns—"I was able to use it for hours and had a blast"—don't touch the setting. Moreover, if your engine is spewing an oily mess, that's good, too! Unlike with spark-ignition gasoline engines, the oil that passes through our alcohol glow engines does not burn. If you see lots of oil, that means plenty of it is passing through your engine and keeping it well lubricated and cooled. It means your engine is running safely. Get used to it now; oily gook is part of the nitro scene. All you need is some Formula 409 or

Fantastik to help you clean up goo, but believe me, goo is good!

DID YOU KNOW?

Here's a contribution from Clint Miller of Savon Hobbies: *You have a cool column. I was reading a response that you wrote to RCMan29594@aol.com. His first question was, "How does the nitro fuel get pumped into the engine." You wrote that the engine creates a semi vacuum. That is only part of how the fuel gets into the carb; the most important way is by the pressure of the exhaust. The line that goes from the muffler/pipe to the fuel tank pressurizes the tank and forces fuel to the engine. If this line is kinked or off, the engine will not run correctly or*

may not run at all. I just wanted to point this out. Thanks for all of the good advice.

Did you know that years and years ago, there were no mufflers at all—only open exhaust ports with valves that closed at low throttle to supply needed idle backpressure. Engines ran just fine back then.

While muffler pressure certainly helps, it is definitely NOT the most important in terms of fuel delivery. Any 2-stroke glow engine will run fine without muffler pressure (granted, not as well). Main needle-valve settings will be very different with and without the muffler pressure. That is why an engine adjusted with muffler pressure will quit when the pressure is

removed (and the mixture is thereby over-leaned). If an engine is initially adjusted with no muffler pressure, fuel is still drawn into the engine and it runs fine.

It's so important you guys understand that negative crankcase pressure creates fuel draw. Understand this principle, and you'll see why maintaining a good piston/sleeve seal is so crucial for reliable engine performance. It's this good seal that creates the crankcase vacuum to draw in the fuel as the piston goes up. If you run your engine too lean, leaks caused by heat-induced premature wear will start to develop between the piston and sleeve. Once this seal has been compromised, a new piston and sleeve is

the only remedy. The most frustrating thing is that the engine will still kind of run with a bad piston/sleeve seal, but it will run very erratically and will be an unpredictable, total pain in the you know what.

Remember, the most important device on your engine is the main needle setting. It not only tunes the engine, but it also supplies vital cooling in terms of a rich mixture. Everything else—low-end needle, fuel pumps, air-chambers ... yes, even muffler pressure—comes after. And be careful whose advice you take to heart. The engine you save could be your own. ■

 Roland

graphic jam.



If you want to add traffic-stopping graphics to your RC cars, check out the STIKA design cutter from Roland. It's small enough to sit on your desktop and powerful enough to create detailed logos, vinyl lettering, custom airbrush stencils, and more. Available in 8" and 12" wide models, STIKA connects to your PC or Macintosh* and provides everything you need to create high-impact graphics, including a lettering and graphics program. Vinyl is available in a wide assortment of colors. Call toll-free or visit our Web site for more information.

* With optional SignMate STIKA Software

Cars designed by:
Kent Clausen HPI
Mike Ogle Team Associated

STIKA Design Cutters. Custom graphics in a flash.

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Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



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Tech Racing
Belt Transmission
for Tamiya
M-Chassis Cars



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Trinity Handwash
Waterless Hand
Cleaner



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BRP
T.C. Super Wing

TECH RACING Belt Transmission for Tamiya M-Chassis Cars Belt That Mini!

There's no shortage of interesting hop-ups for Tamiya's popular lineup of M-chassis mini cars, but some upgrades are less about performance than they are about flashy looks (nothing wrong with that, by the way). But if you crave killer looks and hot performance, then Tech Racing* has just the hop-up for your M-car: a trick belt-drive conversion that matches go-fast looks with real-world performance.

FEATURES

The belt conversion is pure simplicity; a pair of blue-anodized aluminum side plates sandwich a ball differential and a pulley-equipped layshaft. The spur gear is attached to the layshaft and is driven directly by the motor pinion. Any "standard" spur gear can be used, and Tech includes a 102-tooth, 64-pitch spur. The completed tranny is a direct replacement for the original Tamiya tranny.

There are three primary advantages to the Tech belt-drive transmission. The biggest advantage is increased efficiency over the stock gearbox—efficiency that will give your M-chassis better acceleration, higher top speed and longer run time. The belt tranny simply has fewer intermeshing parts, and the use of 64-pitch gears further increases the smoothness of the drive train.

The second major advantage is the included ball diff; unlike the stock Tamiya gear diff, which does not allow any slip, the Tech ball diff can be adjusted to help soften the power delivery and thereby avoid wheel hop

or wheelspin. The ball diff accepts the original dog-bones and is quite smooth.

Finally, the Tech belt conversion allows much greater flexibility in the gearing department; whereas the original car offered only three pinion choices, the conversion tranny allows a much greater range of pinions and spurs in 48- and 64-pitch flavors.

On the negative side, I was a little disappointed to find there is no provision for mounting the kit steering assembly on the Tech unit; it's for a rear-drive chassis only. But unlike the stock transmission of rear-drive M-cars, Tech's belt tranny does not require a reverse-rotation motor; any off-the-shelf stocker or modified motor will drop right in. At first, the rear-only design didn't make sense, but when I considered that the Mini Cooper and the MX Lowdown are the only front-drive M-chassis Tamiya has produced, the rear-drive configuration seems appropriate. Less appropriate are the included bushings, which are out of place on such a trick piece of hardware. I replaced the 10x15mm bronze bushings that support the ball diff with a pair of bearings from DuraTrax. I also replaced the two bushings on the layshaft with 5x8mm bearings.

PERFORMANCE

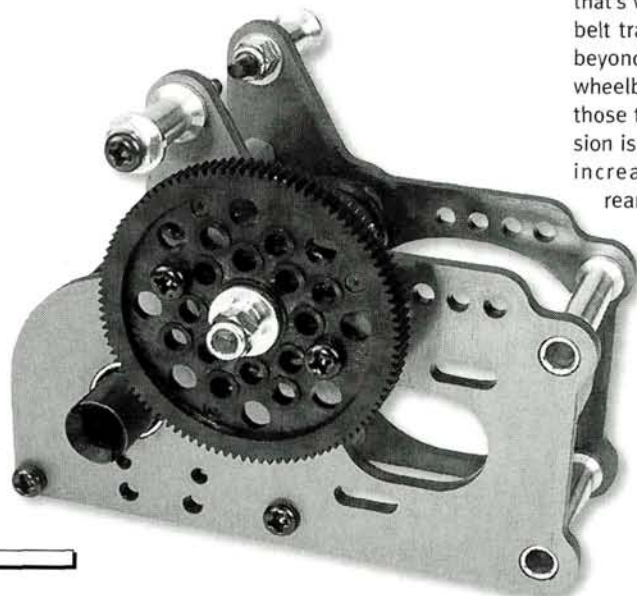
I found the Tech belt conversion much quieter than the stock gearbox, and run time increased dramatically when it was geared similarly to the kit's stock setup. However, the greater efficiency of the belt system allows higher gear ratios to be used effectively, and that's when things get interesting. Geared up, the Tech belt transmission can propel an M-car to speeds well beyond the handling capabilities of the narrow, short-wheelbase chassis. It's fun in a straight line, but watch those turns! In sum, the Tech Racing belt-drive conversion is a well-engineered hop-up that can dramatically increase the performance (and appearance) of rear-drive Tamiya M-chassis cars. —Louie Patterelli

LIKES

- Increased efficiency over stock gearbox.
- Includes adjustable ball differential.
- Greater gearing flexibility.

DISLIKES

- Bearings not included.
- Not compatible with front-drive M-cars.





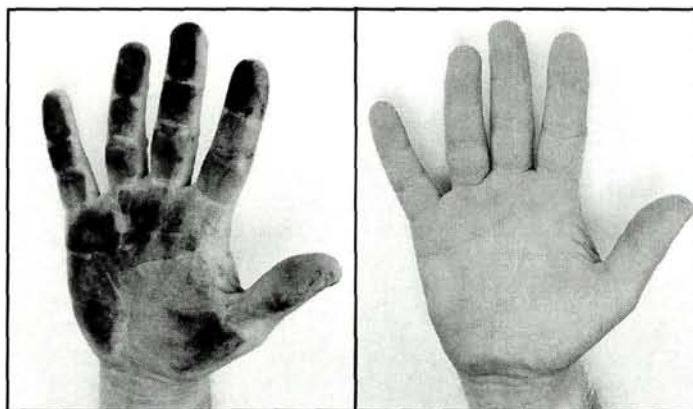
TRINITY

Hand Wash Waterless Hand Cleaner

Avoid the Greasy Fingernail Look!

If you're into any type of motor-sports—full-scale or R/C—you're going to get your hands dirty; it's an immutable fact. This might not be a problem if you're at a cushy indoor track with a big tub of Gojo in the restroom, but all too often, we R/C guys find ourselves at some inhospitable location with gas car spooze, shock oil, diff grease, or some other unfriendly substance coating our hands. That's not the hot setup when you're ready to eat the baloney sandwich you brought for a snack!

If you've lived that scenario, you'll appreciate Trinity's* latest offering. The appropriately named Hand Wash is a waterless cleaner that's meant to remove "sticky R/C tire-traction compounds, grease,



BEFORE

AFTER

Before and after; that filth is actually crud I rubbed off the engine of my Corolla! I needed to use a little more Hand Wash than usual to remove this mess, but my hands came out ready-for-church clean.

LIKES

- Waterless—no sink needed.
- Pleasant (to me) smell.

DISLIKES

- Some may not find citrus scent as appealing as I do.

grime, paint and adhesives." Just squirt a dime-size dollop of the cleaner into your palms, rub away the gunk, then wipe the mess off with a towel—no rinsing required. As promised, the stuff works on all the aforementioned substances and leaves your hands smelling like you just peeled fifty oranges. Mmmm, citrus! Be sure to use Hand Wash only on your hands, though; don't get it near your eyes.

Trinity's Hand Wash is especially good for gas racers, but all R/C hobbyists (boat and plane guys, too) would do well to add a bottle of the stuff to their pit gear. Clean hands will prevent greasy fingerprints on all your gear, and it's just plain nicer to be clean—don't you agree?

—Peter Vieira

DYNAMITE

RedSeal Bearings

Seeing Red—in a good way

Along with an ESC, a good set of ball bearings is a perennial top-of-the-list hop-up item. Thanks to their precise fit and reduced friction, ball bearings help any car run faster, smoother and longer. However, contamination from dirt and debris can quickly reduce silky bearing action to gritty, crunchy inefficiency. Even if a contaminated bearing is rescued in time to be cleaned, the hassles of removal, cleaning, re-lubing and re-installation are time-consuming and definitely low fun.

Dynamite* recognizes this, and has added RedSeal bearings to its line of precision bearing kits. The bearings feature a (you guessed it) red seal that protects the delicate races from contamination in all conditions, including submersion. The

namesake red stuff is actually a Teflon material that provides a very close fit without unnecessary friction. In a particularly daring bit of ad copy, Dynamite calls the RedSeal bearings "the slowest you can buy," referring to the drag produced by the seals before they are broken in. However, I found the bearings to be

exceptionally friction-free straight from the blister pack.

I tried out the RedSeals when I upgraded an RC10B2 Sport to B3 Team car status with Associated's B3 conversion kit and a set of the red spinners. Since installing the set, the bearings have had no maintenance aside from the occasional swipe with a soft brush, and this was only done to the outside hub bearings when I had occasion to remove the wheels. The rest of the bearings have gone untouched since their initial installation, but show no signs of slowing or grittiness; I'm impressed!

Dynamite has such confidence in its RedSeals that they are guaranteed for six months; the package sports a label that says, "Get any dirt in this bearing, and we'll replace it for FREE!" I doubt I'll need to call them on it, but it's a great vote of confidence. RedSeal bearings are available in sets to fit most popular cars and trucks, or may be ordered in various metric and standard U.S. sizes.

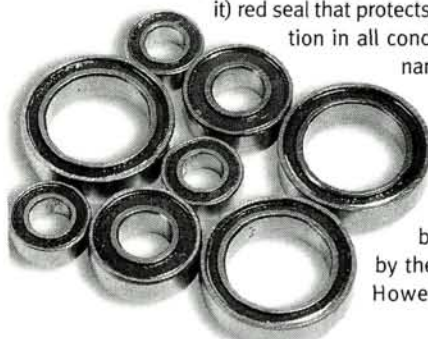
—Peter Vieira

LIKES

- All the performance of precision bearings with none of the maintenance.
- Same price as Dynamite's unsealed bearings!

DISLIKES

- I have to confess, I can't find a downside.





TRINITY

GT Touring Car Series Motors

A Rugged Mod Just for Your Tourer

Machine-wound modified motors have long been the popular choice for sport racers as well as enthusiasts who just like to go fast. If that sounds like you and you're into touring cars, then Trinity has the motors you're looking for.

The GT Touring Car Series mods come in two flavors: GT-1, which features full bearings and adjustable timing, and GT-2, which is a fixed-endbell, bushed motor. Both mills feature the latest EPIC technology and winds chosen specifically for touring cars and the types of conditions most often encountered. "Big deal," you say; "That's nothing new for Trinity." Well, keep reading

We ran GT-1 motors in a recent touring car event—with a twist: this was a four-hour endurance run. We'll bring you all the details in a future issue, but let's talk about these motors. Two identical cars were built for the race, each with 14 x 2 GT-1s bolted into place. The strategy was to switch cars whenever a pack began to dump, so no time would be lost changing packs off track. This strategy went out the window almost instantly, and we ran most of the race with a single car. At least three hours of uninterrupted racing went through that car's motor. During that time, the motor was given one brush change, but no other maintenance. The tire dust wasn't blown off, the bearings weren't lubed and the motor was never cooled—nothing. Even the brush change was unnecessary; the stock brushes that came out had plenty of life left (although we did get better performance with fresh serrated brushes).

Greg Vogel was team *R/C Car Action's* best driver, and he matched the best laps of teams running hot hand-wound motors that had made visits to the comm lathe, enjoyed cleanings between packs

and generally suffered a whole lot less abuse. That GT-1 just wouldn't quit! We had also taken along 12-turn triple GT-1s, just in case we'd need more yank, but they stayed in the box; the 14-turn was plenty. (If you purchase a selection of GT motor winds, write the wind on each can; the packaging indicates the wind, but the motor label doesn't.)

After the race, we inspected the motor: the brushes were burned blue, but the comm was good to go. It didn't hurt that we were running on clean carpet, but to run a motor for three hours nonstop without its going up in smoke is an achievement; a normal race day is a walk in the park by comparison.

We don't suggest you skip your usual maintenance routine if you pick up a GT-1, but at least you'll know it's tough. If your track's touring car class requires fixed-endbell "stock" motors, pick up a GT-2; you'll get the same EPIC technology and you'll save some money. There's always room in this hobby for solid performance at a fair price, and the GT motors deliver just that.

—Peter Vieira

LIKES

- Excellent, long-lasting performance.
- Great-looking chrome can and nice label art (it matters to me ...).

DISLIKES

- The motor label doesn't indicate the armature wind.

BRP

T.C. Super Wing Splendid Spoiler

Esthetics and performance have always been important factors contributing to the success of touring-car racing. Well, it seems as if Bud Bartos of Bud's Racing Products* (BRP) had this in mind when he created the new T.C. Super Wing (part no. 5242). This new wing is both cool-looking and functional. It was designed to be light yet rugged, so you'll want to add this accessory to your arsenal.

Specifically designed for touring cars and sedans, the new bi-level wing has a lower surface that's easily adjusted with two screws, and both

upper and lower surfaces have a considerable amount of rear kick-up for added downforce. Large side dams are also included and dramatically improve straightaway stability. The wing can be easily assembled in minutes, and all the necessary nylon screws and nuts are provided.

The wing can be mounted on your car's existing wing mounts, or you can use the separate standoffs that are included with the wing kit. The wing's tough clear Lexan can be painted and detailed with standard polycarbonate paint, so you can add your own custom touch.

—Kevin Meyer

LIKES

- Adjustable, high-downforce design.
- Easy to assemble.
- Can be painted to match car.

DISLIKES

- Not IFMAR-legal.

The bi-level design adds extra downforce to the rear of your sedan. BRP's T.C. Super Wing is also tunable and can be adjusted for more downforce. The large side dams can be trimmed, if you desire.



IF THE LETTERS and email we receive every day at *R/C Car Action* are any indication, trucks are the number-one type of vehicle owned and lusted after by our readers. We get many requests for gearing advice, setup options and troubleshooting help, but the typical request for truck info goes something like this:

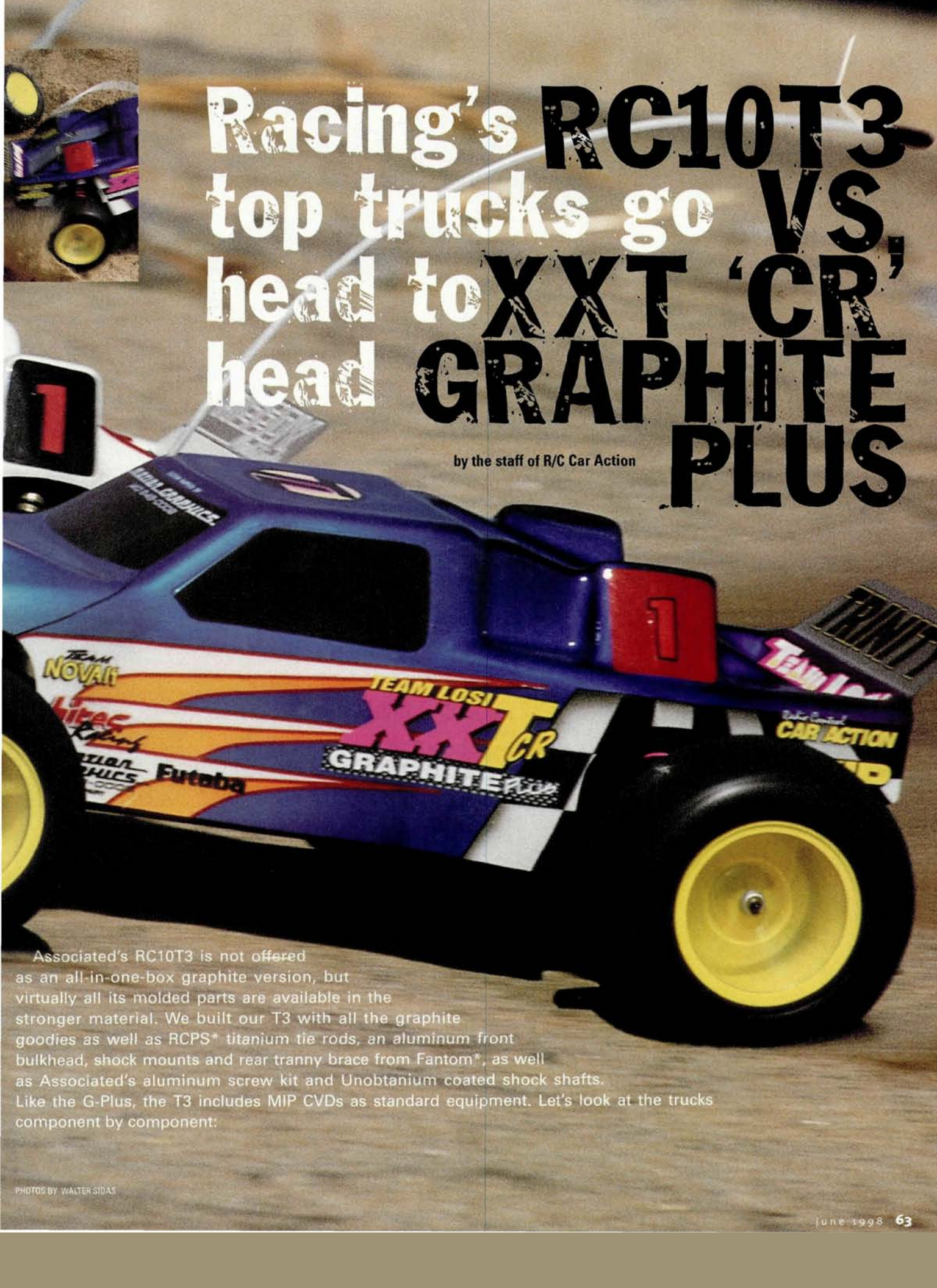
"Which is better?: the Associated RC10T3 or the Losi Double-Xt 'CR'?"

Good question. The twin titans of truckdom are now in their best form ever, as Losi[®] has just released the Double-Xt 'CR' Graphite Plus (a graphite-and-titanium-fortified version of standard 'CR') and the new T3 represents the A-team's concept of state-of-the-art racing truck technology. We've peeled back the bodies of both machines to see how they differ, taken them to the track for back-to-back testing and solicited the comments of both factory pilots and average club guys for the final word on Losi's and Associated's* big-tire gladiators.

GETTING TECHNICAL

We built both trucks as fully optioned racing machines. The Double-Xt 'CR' Graphite Plus (G-Plus) arrives with many options already included; Lunsford titanium turnbuckles, a dual-disk slipper (à la Kinwald Special Edition), ball-bearing steering, aluminum top shaft and top gear, titanium-nitride shock shafts and MIP CVDs are all standard equipment.

As the name implies, all the G-Plus's molded parts are constructed of Losi's graphite-reinforced material. We also added a few hop-ups of our own, such as Trinity's front suspension brace, rear tranny brace and blue hardware.



Racing's RC10T3 top trucks go VS, head to head XXT 'CR' GRAPHITE PLUS

by the staff of R/C Car Action

Associated's RC10T3 is not offered as an all-in-one-box graphite version, but virtually all its molded parts are available in the stronger material. We built our T3 with all the graphite goodies as well as RCPS* titanium tie rods, an aluminum front bulkhead, shock mounts and rear tranny brace from Phantom*, as well as Associated's aluminum screw kit and Unobtanium coated shock shafts. Like the G-Plus, the T3 includes MIP CVDs as standard equipment. Let's look at the trucks component by component:

RC10T3 VS. TXT 'CR' GRAPHITE PLUS

GRAPHITE PLUS

DIMENSIONS

Wheelbase (adjustable) 11.31 to 11.43 in.
Width (F/R) 12.75 in.

WEIGHT

RTR 3 lb., 15.5 oz.

CHASSIS

Type Molded semi-tub
Material Graphite-reinforced plastic

DRIVE TRAIN

Transmission Sealed 3-gear
Ratio 2.61:1
Differential Ball
Drive shaft MIP CVD
Slipper clutch Double-pad friction

SUSPENSION

Type (F/R) Lower A-arm w/adj. upper link
Front arm length 3.875 in.
Front hinge-pin spread 1.81 in.
Rear arm length 3.875 in.
Rear hinge-pin spread 1.875 in.
Rear toe-in (per side) 3 degrees
Rear toe at hub/arm Arm

TIRES

Front Team Losi Directional rib (silver)
Rear Team Losi IFMAR pin (silver)

LIST PRICE \$419.95

OPTIONAL PARTS TESTED

• Trinity
Pack pillows RC7027
Aluminum shock bushings TK3029
Transmission brace TK3030
Front brace TK3002
Blue buggy washers TK3031
Motor screws TK3020
Blue-aluminum screw kit TK3061

Width (F/R) measured at widest point on tires. Suspension-arm lengths and hinge-pin spreads measured from hinge-pin centers. Rear hinge-pin spread measured from rear of hinge pins.

CHASSIS

- Both trucks feature molded-plastic chassis, use the preferred down-the-centerline battery layout, and allow fore-and-aft battery-position adjustment.
- The T3 offers better battery access, as all cells remain completely exposed no matter how they are placed in the chassis. The

G-Plus conceals a cell when running the pack fully aft, and that makes it difficult to hard-wire the pack.

- Both chassis have raised sides. The Losi



Only the best stuff went into our test trucks. The Graphite Plus was equipped with a Novak Cyclone ESC, a Trinity D3 motor, Trinity VIS-Extra cells, and a Hitec 605BB servo. Futaba's 3PJ handled the transmitting chores.

chassis is deeply stepped to create a "spine" effect, while Associated's design simply angles the chassis sides. Both allow greater cornering clearance and present less surface area to scrape against the ground if the chassis bottoms out.

- Neither chassis seems to have any advantage in stiffness, but servo access is much better on the T3; remove two screws, and the servo is in your hand. The G-Plus requires the removal of four deeply threaded screws to accomplish the same feat.

SUSPENSION

- The G-Plus includes titanium Lunsford Punisher tie rods. The T3 is equipped with steel turnbuckles as stock, but we replaced these with RCPS' titanium units.
- The G-Plus has longer front arms than the T3 and places the front hubs' hinge pins closer to the centerlines of the front wheels. The G-Plus's longer arms should help the front suspension cope better with big hits and increase stability, but we'll wait and see what happens at the racetrack.
- The T3's front arms feature screwed-on yokes to hold the shock ends above the suspension arms.
- Losi's front suspension arms are "lefts"

time-warp trucks

Remember these? The truck on the left is a Losi JRX-T—the first real out-of-the-box racing truck—state of the art in 1990. It wasn't much more than a JRX-2 with truck wheels and tires, a set of tall body mounts and a pickup body, but it set the truck-racing world on fire. The JRX-T's five-link rear end is now considered an anomaly, but it worked well, according to Gil Losi Jr.: "Once in a while, someone will bring one of the old trucks out, and it works well; it makes more traction than an A-arm car. There's just too much to do to keep it race worthy—too many pivots."



Richard Muise of Motion Graphics painted these two stunning bodies.





The T3 got an LRP V6 speed control, a Reedy Sonic 2 motor and Zapper pack and a Hitec 525BB servo. An Airtronics M8 kept the T3 under control.

and "rights"; the T3's are interchangeable.

- Both machines use bolt-on plates to hold the rear shocks in place on the rear suspension arms, but Losi offers more

mounting options for the shock ends—three holes where Associated offers just one. Likewise, Losi offers more shock-placement options on the shock tower—four holes available per side, front and rear, compared with the T3's two holes for each shock on the front shock tower and three per side in the rear.

SHOCKS

- The G-Plus and the T3 feature hard-anodized shock bodies.
- Associated combines Teflon pistons with a Teflon coating inside the shock body to reduce friction. O-ring seals are snapped into the bottom of the shock, and the shock is filled with oil from the top.
- Losi's dampers rely on a slick anodized surface to reduce friction within the shock, and they use lozenge-shaped pistons that present less surface area to the shock-cylinder walls. Pre-assembled seal cartridges are threaded into the bottom of the filled shock body, and Losi's slick, titanium-nitride shock shafts are included as stock equipment.
- We find Losi's shocks a little easier to build and bleed properly. However, Associated is thanked for including a full assortment of pistons with the T3; Losi offers only one set with the G-Plus.

RC10T3

DIMENSIONS

Wheelbase (adjustable) 11.5 to 11.375 in.
Width (F/R) 12.5/12.5 in.

WEIGHT

RTR 3 lb., 13.25 oz.

CHASSIS

Type Molded semi-tub
Material Graphite-reinforced plastic with aluminum front and rear plates

DRIVE TRAIN

Transmission Sealed 3-gear
Ratio 2.4:1
Differential Ball
Drive shaft MIP CVD
Slipper clutch Single-pad friction

SUSPENSION

Type (F/R) Lower A-arm w/adj. upper link
Front arm length 3.53 in.
Front hinge-pin spread 1.5 in.
Rear arm length 3.875 in.
Rear hinge-pin spread 1.5 in.
Rear toe-in (per side) 3 degrees
Rear toe at hub/arm Arm

TIRES

Front Pro-Line Pro-95
Edge M2
Rear Pro-Line Pro-90
Holeshot M2

LIST PRICE \$340 (stock Team truck)

OPTIONAL PARTS TESTED

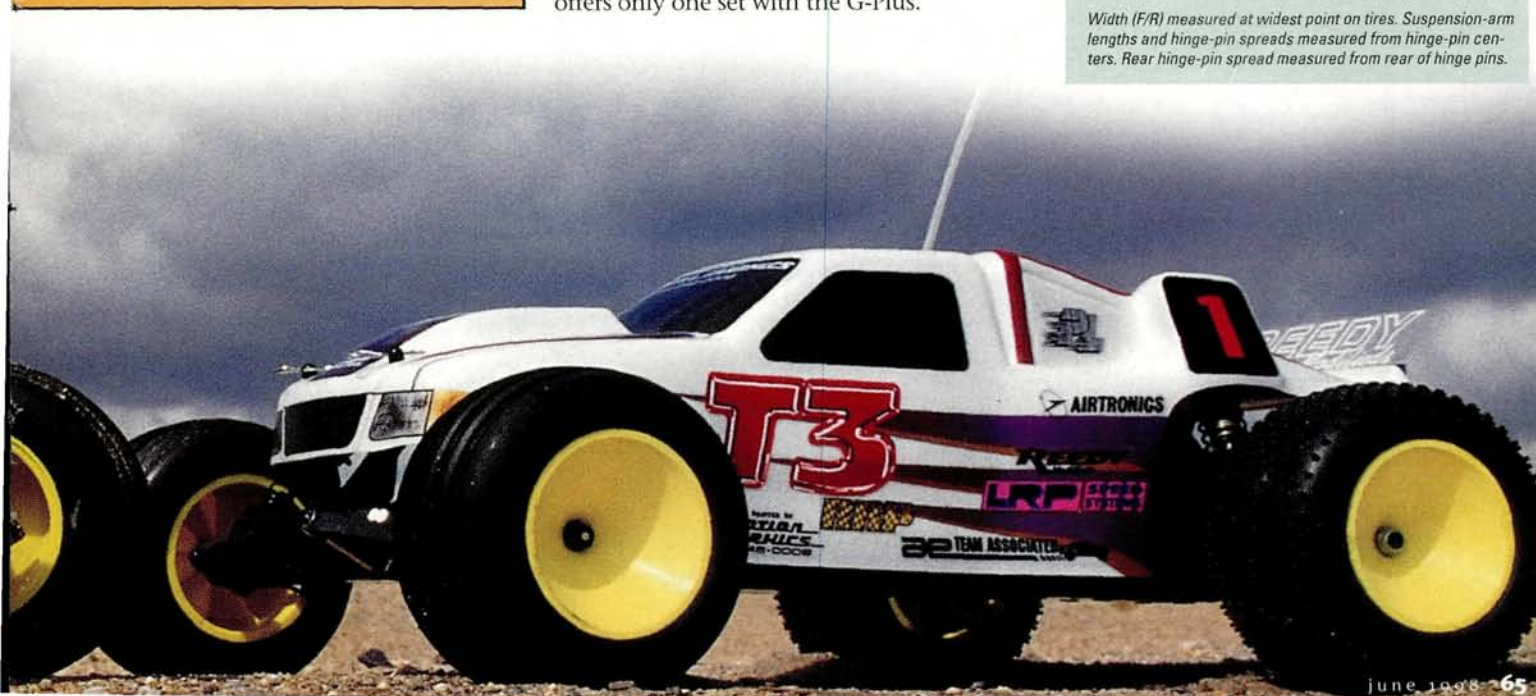
• Associated	
Graphite—chassis	7309
—battery brace	7334
—rear arms	7339
—shock tower	7219
—front arms	7204
—rear shock tower	7349
—front brace	9131
Bellcrank bearings	9162
1.32 in. Unobtanium shock shaft (2)	6416
1.01 in. Unobtanium shock shaft (2)	6417
• R/C Performance Specialties (RCPS)	
Titanium tie-rod and camber-link set	
• Fantom aluminum parts	
Front bulkhead	F353
Transmission brace	F354
Shock mounts	F355
• Robinson	
86-tooth Absolute Spur gear	RRP1786
Hardened-aluminum pinion	RRP1222

Width (F/R) measured at widest point on tires. Suspension-arm lengths and hinge-pin spreads measured from hinge-pin centers. Rear hinge-pin spread measured from rear of hinge pins.



The Associated RC10T came about a year later. The 10T was the first truck to use the long A-arms we associate with racing trucks today, and it cleaned up at racetracks across the country in all levels of competition.

The 10T shown here features the original narrow front wheels. Cliff Lett elaborates: "When we were designing the RC10T, the truck class rules were in their infancy. The first RC10Ts came with narrow front tires because we thought they looked more realistic, and they worked well. But later, the rules were changed and they became illegal to use in competition."

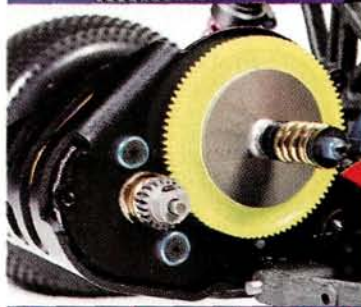


STEERING

- The T3 and G-Plus use traditional bellcrank steering systems with lateral servo placement and built-in servo-savers.
- Both trucks offer two Ackerman settings on the bellcranks, and both manuals call for the use of the less aggressive position (outside holes on bellcranks). If you select the inner set of holes, the trucks will exhibit a greater difference in tire angle as

the wheels are steered. This increases turn-in, but it does so at the expense of stability.

- Kingpin/ball studs perform double duty as hub pivots and camber-link locations on both trucks. This design puts the camber link directly over the kingpin. Both machines set their kingpins about $\frac{3}{8}$ inch within the wheel. If the geometric relationship of the kingpin and wheel were the only factor determining steering precision, the T3 and G-Plus would be virtually equal.



The Graphite Plus features a slightly lower spur-gear position and a dual-disk slipper. The T3's single-disk slipper permits gear changes without altering the slipper adjustment. Our test T3 features a Robinson Absolute spur gear, and both trucks use trick Trinity motor screws.



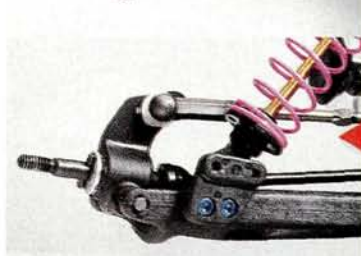
The T3 features an integral rear bulkhead that provides a wide base for the shock tower. The Graphite Plus uses a separate, narrower bulkhead, but the shock tower is heavily braced. Transmission braces by Trinity (left) and Phantom (right).



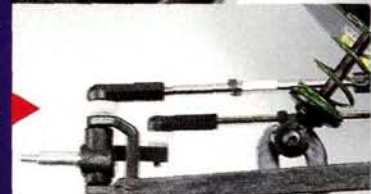
The Graphite Plus's front end has more braces than an orthodontist's waiting room. It's stiff, but servo access is poor. The T3's open-air design is much cleaner (and lighter), but we found the servo-saver adjustment wheel difficult to operate.



The Graphite Plus features extra-long front arms that reach past the hubs' kingpins; the T3's arms are shorter and use the hub carriers to increase the width of the front end; the hubs hang past the outboard hinge pins.



Both rear suspensions position the hubs directly over the hinge pins. The Graphite Plus offers three shock-mounting options whereas the T3 has just one. Both trucks are equipped with MIP CVDs as stock equipment.



WHAT DO RACERS LIKE YOU THINK?

As interesting as the insights of the factory pros might be, it is Joe Average who determines the ultimate success or failure of a racing truck. After all, the factory guys get their stuff for free; it's the weekend club racer who drives the industry. If the truck in question can't win in the hands of a "regular guy," then it just isn't going to make it! We asked some of the locals at California's M n M Raceway why they chose the rigs they race.

■ **Byron Kessee**
Las Vegas, NV

Expert stock: Associated T3

I've recently graduated from the T2 to the T3, and in terms of building, the T3 is much easier to put together. Let me say this about its performance: from the first moment I put the truck on the track, I was turning faster lap times. The first thing I noticed about the T3 is that the front end is much lighter. The T3 is much more adjustable in terms of battery placement than the XXT 'CR.' This is a great tuning advantage. I also noticed that the T3 is a better jumper than the T2. I attribute that to the truck's abundant rear traction and to the fact that the T3 is slightly lighter than the T2.



■ **Derek Pocaroba**
Garden Grove, CA

Expert mod: Team Losi Double-XT 'CR'

I've been racing my Losi XXT 'CR' for a little over a year. I've tried a friend's T3 and like the truck a lot, but at some tracks, it doesn't work as well as the XXT. For instance, it seems to work better on loose conditions and is harder to set up for high-bite situations like those found here at M n M Raceway. I think the XXT 'CR' is more adjustable than the T3; in fact, you can change just about everything on the Losi or change nothing at all, and the truck will work just fine. I think that it's easier to get dialed out on the T3 than it is with the XXT 'CR,' but that's my opinion. My Losi truck has also been very durable; in fact, I've been racing this truck since I started competing and recently converted it to a 'CR.'



■ **Larry Turner**
Harbor City, CA

Sportsman mod: Associated T3

I owned the first RC10T then moved on to the T2, and now I race a T3 as well as a B3 buggy. I recently tried the Losi truck, but I seem to have adjusted to the Associated vehicles, and find them easier to dial in than the Losi. I've found that the new T3 is even easier to build now, thanks to the new instructions and high-quality parts. The diff, in particular, is extremely easy to build—much easier to build than the Losi diff—and I also think that the T3 is every bit as adjustable as the XXT 'CR.' The guys who race them around here are very successful.



■ **Justin Morrison**
La Verne, CA

Expert stock: Team Losi Double-XT 'CR'

The Losi truck feels right at home on rough tracks and is very fast on smooth tracks as well. I think that the Associated T3 is a great truck and handles very well, but on rough tracks, it seems to float a little bit. I think that the trucks are of equal quality and that neither is any better or stronger. I've had more experience with Losi vehicles and feel that the XXT 'CR' suits my driving style a little better. The Losi vehicles also have more aftermarket support than the Associated vehicles and, in my opinion, are more adjustable. I think that Associated makes a great truck, but I'll stick with my Losi.



TRANSMISSION

- Both trucks use a three-gear, bottom diff design.
- Losi's design puts the gears in a more "laydown" position and holds the motor lower on the chassis. In G-Plus trim, the transmission also features a lightweight aluminum top shaft with integral aluminum top gear and Losi's new double-disk slipper clutch, which permits a looser clutch setting without the heft of a Hydra Drive system.
- The T3's single-disk slipper uses a larger-diameter slipper pad for better clutch action than that of the T2.
- The T3 gets high marks for its long-lasting, smooth diff action.
- Kudos to Losi for making the Double-X series' diffs externally adjustable; you can't adjust the T3's diff without popping a dogbone, once the truck has been built.
- Losi opts for a 2.61:1 ratio while Associated opts for a taller 2.4:1 ratio—the same as is found on the B3 buggy. This gives the T3's transmission total parts compatibility with the B3—a boon to racers who compete in both truck and buggy classes.

I've owned Losi and Associated trucks in the past, but this shootout was an excellent opportunity to wring out both brands back to back. The Associated T3 is slightly smaller than the Losi Graphite Plus, but it drove "big"; the T3 proved to be a stable jumper, and rough-track handling was better than what I remember of the T2. Cornering was precise, although the Losi felt just slightly more locked in; the G-Plus is glued! It must be those extra-long arms. Whatever the reason, the truck works. The only area in which it didn't seem to match the T3 was efficiency. The T3's exceptionally smooth Stealth tranny (and a slight weight advantage) helped it when we tested the trucks with stock motors; the T3 pulled the G-Plus by almost a full truck length. All in all, I'd say the T3 is the better stock-class racer, and the Graphite Plus—while certainly capable with a stock mill—is slightly better suited to the world of hairy horsepower. —Peter Vieira

The Associated RC10T3 and Team Losi Double-XT 'CR' are highly competitive vehicles that will meet the needs of all drivers from novice to expert. Both are fairly easy to build, come with excellent instructions and offer a multitude of adjustment possibilities that allow racers to tune for a wide variety of track conditions. Support for both is good; you'll find replacement and performance parts at most hobby shops.

Choosing just one truck is very difficult and highly subjective. After hours of pondering, I chose the Associated T3 for these reasons:

First, the Associated RC10B3 and the T3 have the same transmission ratio. I've found that most off-road racers usually own a 2WD buggy as well as a racing truck so they can participate in two different racing classes. Having the same transmission ratios in these vehicles cuts down on spare parts.

Second, I prefer the T3's chassis because it's easier to put together (fewer parts) and features an aluminum nose plate and transmission mount, which makes for an incredibly sturdy foundation.

I also like the T3's battery-mounting system and feel that it offers more scope for adjustment.

Finally, I feel that the T3 body is far more esthetically pleasing than the Double-XT 'CR's body. In my opinion, the T3 has cleaner lines and looks more in scale. —George M. Gonzalez

I give up! After driving the trucks, I can't single out a winner. At the track, they exhibited outstanding handling. I drove a box-stock XXT 'CR' in many races last season and am used to its ease of driving and setup. Then I took the wheel of the Losi's new Graphite Plus, and its strong, lightweight components are noticeable improvements. The double slipper delivers consistent power that allows the truck to accelerate quickly and smoothly on the straights and through the bumps.

I took the Associated T3 for a drive. Hey! This truck has an abundance of steering; I like it! The full-option T3 also accelerated quickly and smoothly—much better handling than the T2.

In my opinion, the trucks are pretty much equal in performance. If one has an advantage in one area, the other scores higher in another, so if points could be tallied, it would probably result in a tie.

To pick the one that's best for you, check out your local hobby shops; whichever machine they support with parts and know-how could be the one for you. If the support is equal, go for the one that looks better to you—then again, they both look cool! —Greg "Swab" Vogel

Billy Easton

PRO POINT OF VIEW

Mark Francis



Factory pilot Billy Easton has been racing Associated trucks since the first RC10T, and most recently, he put a T3 into the top three at the WinterChamps. We asked Billy a few questions about Associated's top truck, past and present.

R/C Car Action: Billy, you've gone from the 10T to the T2 and now to the T3. How has the truck's performance changed?

Billy Easton: From the original RC10T to the T3, you're going to find that the truck is waaay more stable than it used to be. A long time ago, the truck used to bounce around a lot and didn't have nearly as much traction. On our newer truck, we have far more traction and the car is much easier to drive. Especially in the bumps and rough stuff, the truck handles a lot better than the 10T ever did.

RCCA: Which elements of the T3's design give it that superior handling?

BE: I think the long arms are important; the original truck's were much shorter. A lot of the components now use a harder, stiffer material—more of a composite—and that takes a lot of slop and twist out compared to the older parts, allowing the car to be more rigid.

RCCA: Would you agree that moving to a molded chassis was also a big improvement?

BE: Oh, yeah, definitely. As far as the chassis goes, it's easier for assembly, and it's a lot better than aluminum; it's not going to bend or anything like that.

RCCA: Billy, have you got any good T3 setup tips for us?

BE: Believe it or not, the instruction manual setup is probably the best way to go. No matter where we tested the truck, that setup was very close to ideal.

RCCA: We built our test T3 with all sorts of hop-ups. Which hop-ups do you recommend for the guy with a stock truck? Which ones do you feel help the most?

BE: Well, if you haven't got bearings, that's the first thing to get. I'd say the Unobtainium shock shafts are definitely good to have. They'll smooth out your suspension a little more and make it more consistent, and the shocks will last a lot longer.

RCCA: Thanks a lot, Billy; we hope you have good luck at the Cactus Classic. Say hi to George Gonzalez!



Team Losi dominated the Truck Mod class at the WinterChamps, thanks to Alex Guerrero's top-qualifying drive and Mark Francis' back-to-back A-main wins. We spoke to Mark about his experience with the Double XT 'CR.' As a recent addition to Team Losi from Team Associated, Mark also offered some insights on the T3.

R/C Car Action: Mark, tell us what you like about the Double XT 'CR.'

Mark Francis: The truck is pretty smooth. I like the way you can slide the truck more; it feels more consistent.

RCCA: Can you point to any elements of the Double-XT's handling that you feel give it an advantage?

MF: I think it has good cornering speed.

RCCA: The Double-XT has a higher transmission ratio than the T3. Is that an advantage?

MF: I don't think so. Associated had a 2.6:1 before they went to the 2.4:1, and I thought they both worked fine. It's easier for the drivers to carry parts for one gearbox, but there's no advantage on the track.

RCCA: Do you have any setup tips for the Losi drivers out there?

MF: I set my truck fairly stiff. When I ran the Associated truck, the setting was generally a little softer, whereas the Losi truck—and the cars, I've noticed—you can run a little stiffer. I prefer to run my cars stiffer because it helps with jumps; the transition from the jumps to the acceleration after landing is better when you have a stiffer car.

RCCA: The Graphite Plus is loaded right out of the box. For our readers with stock trucks, which hop-ups do you feel most affect the truck's performance?

MF: The graphite chassis is a little bit lighter, and it is stiffer, so that makes the truck turn a little quicker. I would say that the chassis and graphite suspension arms will give you the most benefit, provided you already have a set of bearings and the right tires—that sort of thing. The graphite parts definitely help.

RCCA: Thanks for the comments, Mark. I'm sure we'll see you at a race again soon.



Schumacher SST 2000 '98

by Jim Knepley

SCHUMACHER SHOULD BE commended for the innovative designs of its CAT '98 and Fireblade. These two off-road success stories have been sneaking up on the competition and making their mark on winner boards everywhere. Meanwhile, the SST 2000—a sedan variant in the CAT line—has been making its own mark on the tarmac scene, and Schumacher has further advanced its touring technology with the new SST 2000 '98. This latest addition to an already successful lineup offers upped racing potential and enhanced user-friendliness. Let's find out why the SST 2000 '98 is topnotch.*

Supersonic sedan





The stock Peugeot body was painted by Scott Bich of Bich'n Bodies—another fine replication of a full-size car, I must say! Also shown is the Hitec Lynx FM radio used for testing.

s p e c s

SCALE 1/10
LIST PRICE \$369

DIMENSIONS
Length overall 14 in.
Wheelbase 10 in.
Width 7.25 in.

WEIGHT
Gross, RTR 3lb., 2.75 oz.

CHASSIS
Type Dual deck
Material Fiberglass

DRIVE TRAIN
Type Dual Kevlar belt
Primary Pinion/fixed spur
Transmission Plastic drive shafts
Differentials High-torque ball
Bearings Ball bearings

SUSPENSION (F/R)
Type Lower A-arm with adjustable upper link
Damping Plastic-body, oil-filled, coil-over shocks with adjustable damping

WHEELS
Type 5-spoke plastic
Dimensions 2x1 in.

TIRES (F/R)
Type White-compound slicks

ELECTRONICS
Motor, radio, battery, etc. Not included

BUILDING & SETUP TIPS

■ There are many adjustments on the SST 2000. Like any kit, it must be carefully dialed in to get the best performance. A set of camber and toe-in gauges will help you with tuning.

■ Using a toe-in gauge, set the rear wheels to 3 degrees of toe-in and the fronts to 1 degree of toe-in. Check the lengths of the rear toe links with the calipers; they should be equal, or your car will be out of alignment. Keep in mind that changes in toe-in can affect camber and vice versa. Set the camber to -1 degree front and rear.

KIT FEATURES

• **Chassis.** The new car's most noticeable difference from the previous model is its fiberglass "side-saddle" chassis that repositions the batteries along the right side and moves all of the electronic components to the left. The chassis is also quite light, as all extra material has been painstakingly removed to reduce weight. These changes make a sturdy platform that cleans up the wiring considerably compared with that of the older models, in which the wires ran dangerously close to the drive belts. A new slim top plate gives the chassis a little flex, which should make the car more forgiving to drive.

• **Transmission.** The drive system rides on silky-smooth ball bearings and features angled dual belts—the same technology as is found on the CAT 2000 '98. From above, it is easy to spot the SST '98's "crooked" spur gear, motor and front belt. This layout allows narrower bulkheads to be used for the front and rear ball diffs, and it centers the diffs on the chassis. The narrow cases also allow the suspension arms to extend farther toward the chassis center for improved handling. Unique, molded-nylon "blade" drive shafts transfer power to the wheels.

• **Suspension.** Fully independent wishbones and coil-over shocks keep the car stable when maneuvering on the track. Setscrews in the arms allow fine adjustment of the ride height and tweak. Other adjustable features include anti-squat, camber, caster and toe. The instructions provide excellent information about the effect each setting has on handling, but



Electronics to the left; batteries to the right. The new chassis distributes the weight evenly while concentrating the weight close to the chassis centerline. Notice the off-center belt drive.

there is no substitute for your own testing. Oil-filled, nylon-composite shocks function smoothly and are quite light. The shock pistons are the same adjustable units as Schumacher has used for years. The stock springs are a good starting rate and should provide acceptable handling right out of the box.

• **Electronics.** I chose new high-performance gear from Hitec*, Peak* and Team Orion*. A Hitec Lynx FM radio and HFS-04MI+ receiver kept me in control, while Hitec's HFX speed control and HS-605BB servo handled the throttle and steering duties. A pack of Orion's matched Powers cells delivered the juice to a Peak

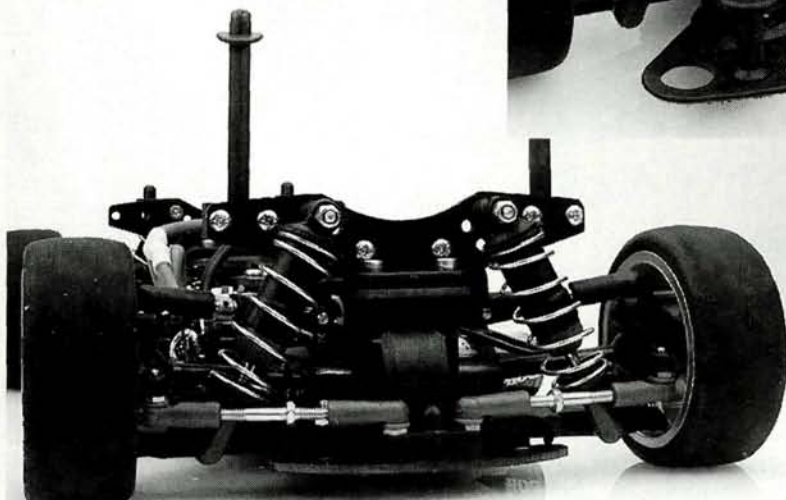
FACTORY OPTIONS

- Alloy shock bodies—U2024
- Alloy one-way pulley (requires layshaft)—U1910.
- Spring-tuning set—U1921.
- Motor heat-sink set—U1909.
- Anti-roll bar set—U1919.
- Lexan belt guard—U1920.
- Microshocks—U2039.
- Foam body protector—U2022.
- Carbon fiber shock bracket—U1904.
- Titanium tie rod and hinge pin set—U1908.
- Graphite side-saddle chassis—U2028.
- Graphite Slim SP top deck—U2030.
- 4mm rear drive belt—U1527.
- Steel drive-shaft "blades"—U1917.
- Alloy hub carrier—U2075.
- Alloy rear transmission housing—U2034.

YOU'LL NEED

- 2-channel radio system.
- Electronic speed control.
- Motor and pinion gear.
- 6-cell saddle-pack battery.
- Paint for the Lexan body.
- Charger.

Nightmare stock motor. I initially found the molded battery straps tight, but they have stretched with use. Since there isn't always power for a soldering iron at a parking lot, you may want to consider using plugs for your batteries and motors as I did; for a no-voltage-loss connection, I chose Deans* plugs.

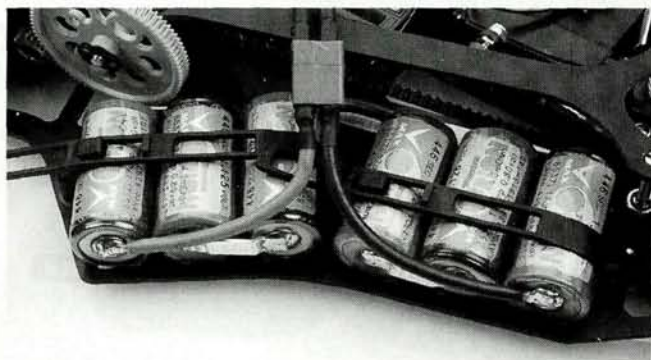
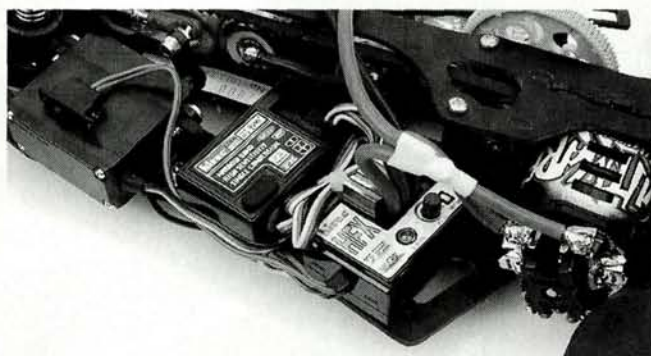


Toe, camber and tweak adjustments can be made at the rear wheels. The adjustability of the car makes it a top contender in racing and a blast on the streets.



Left: up front, large-volume oil-filled shocks are mounted on a fiberglass shock tower. Note the narrow bulkhead and wide suspension arms.

Below: Hitec electronic gear fills the left side of the chassis. The HFX speed control exhibited smooth throttle response, while a Peak Nightmare stock motor provided the squirt.



A set of matched Powers cells from Team Orion powered the car during our tests. The new side-saddle battery layout cleans up the wiring and looks plain cool! The snap-shut battery straps allow quick pack changes.

Likes

- Great performance right out of the box.
- Pre-assembled.
- Good range of hop-up parts.
- Excellent tunability.

- Turnbuckle adjustment tool isn't included.

dislikes

PERFORMANCE

I made my first runs with the car set up exactly as Schumacher suggests in the manual. After a few passes, I decided to switch to Ride* tires in the rear, as the stock, white-compound tires weren't hooking up well on that particular surface.

It took a few laps to get a feel for how the SST handles. I was extremely pleased with the speed at which it reacted. I could get the car out of shape if I pushed it too hard, but it recovered admirably. After a

while, I was able to get into "the zone" in which I could handle the track's tight sections with little more than a flick of the control wheel.

During subsequent weekends, I got a better feel for the kit's handling and was able to carve it around the track quickly. In the hands of an expert, I am convinced that this car could win anywhere.

What about in the hands of a novice? I handed the transmitter to a young onlooker who asked if he could take a crack at it. The car was forgiving enough to let him get around the track and certainly fast enough for a lot of fun.

FINAL THOUGHTS

Compared with the other touring cars I have driven, the SST 2000 '98 felt more than competitive. With a good set of tires and some refinements to the setup, this

car handles better than I can drive it. It's fast, handles well and is a blast to drive. That it's offered assembled will make the SST 2000 '98 all the more appealing to novices, while Schumacher's commitment to further refining this winning kit will make it appeal to experts. If there's a touring-car purchase in your future, be sure to check out the SST 2000 '98.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.

THE COMPETITION

	Kyosho TF-3	HPI RS4 Pro	Tamiya TA03F-Pro	Schumacher SST 2000 '98	OFNA Z10	Roadrunner XPress	Yokomo YR-4 M2	Tech Racing Voggerd
Wheelbase	10.3 in.	10 in.	10.1 in.	10 in.	10.15 in.	10.25 in.	10.125 in.	10.375 in.
Width (F/R)	7.75 in.	7.25/7.125 in.	7.19 in.	7.25 in.	7.48 in.	7.25 in.	7.25 in.	7.25 in.
Weight	3 lb., 5 oz.	2 lb., 8 oz.	3 lb., 8.7 oz.	3 lb., 2.75 oz.	3 lb., 2.5 oz.	3 lb., 2.8 oz.	3 lb., 2 oz.	3 lb., 7.9 oz.
Diff type	Gear	Ball	Ball	Ball	Ball	Ball	Ball	Ball
Chassis	Double-deck	Carbon-fiber	FRP**	Fiberglass	Graphite	Carbon fiber	Graphite	G-10 fiberglass
List price	\$259.99	\$399	\$356	\$369	\$379.95	\$385	\$425	\$289.99
Available at*	\$219.99	\$259.99	\$199.99	\$225	\$215.99	\$225	NA	\$189
Reviewed in	1/98	10/97	10/96	12/96	4/98	4/97	11/97	10/97

*Prices vary with location. **Fiberglass-reinforced plastic.

Traxxas Nitro Sport

by George M. Gonzalez

OUR LOYAL READERS will probably remember the Traxxas* Nitro Sport "First Look" that we published in the February issue. At that time, we promised that you'd be seeing a lot more of this truck, and after weeks of testing, the time has come to reveal our findings. If you've been wondering whether the Traxxas Nitro Sport really is the quick ticket to nitro excitement, here's your chance to find out.



PHOTOS BY WALTER SIDAS



s p e c s

SCALE 1/10
LIST PRICE \$345 (RTR w/radio),
\$280 (RTR w/out radio)

DIMENSIONS
Length overall 17.5 in.
Wheelbase 11.31 in.
Width (F/R) 12.5/12.36 in.

WEIGHT
RTR 4 lb., 4.5 oz.

CHASSIS
Type Double deck
Material Composite upper deck,
composite and stamped-
aluminum lower plate

DRIVE TRAIN
Type Gear
Primary Clutch bell/spur
Transmission 3-gear (2.81:1 final ratio)
Differential Planetary gear
Bearings/bushings Bearings/Oilite bushings

SUSPENSION
Type Lower suspension arm
with adjustable
upper links
Damping Plastic oil-filled,
coil-over shocks

WHEELS
Type One-piece nylon
Dimensions (DxW) 2.2x2 in.

TIRES
Type Rubber ribbed/spiked

POWERPLANT
Engine TRX 15
Pipe Composite tuned pipe
Carb Single adjustment
rotary-barrel

instant **nitro**
excitement



YOU'LL NEED

- 12 AA batteries (8 for radio, 4 to power receiver and servos).
- Fuel.
- CA for the tires.
- Lexan-compatible paint for the body.
- After-run lubricant (highly recommended).
- 6-cell R/C sport pack.
- Battery charger.

FACTORY OPTIONS

- Pre-lubed air filters
 - Three sets 2-stage filters—part no. 4062.
 - Three sets 3-stage filters—4063.
- TRX-Pro 15 6mm-bore carburetor—4033.
- TRX-Pro 15 heat-sink head—4032.
- Pro-style ball diff (with bearings)—4420.
- Hard-anodized, Teflon-coated big-bore shocks.
 - Long (front)—2660.
 - Extra-long (rear)—2662.
- Rear shock tower:
 - Fiberglass—4440.
 - Graphite—4440x.
- Front shock tower
 - Fiberglass—2518.
 - Graphite—2518x.
- Aluminum tuned pipe and header (blue-anodized)—4485.
- Eight 5x11x4mm ball bearings for the wheels—4607.
- Steel clutch bell
 - 16-tooth—4116.
 - 18-tooth—4118.
 - 20-tooth—4120.
 - 22-tooth—4122.
- Hardened-steel differential output yokes—4628x.
- 25-degree caster blocks—2634R.

BUILDING & SETUP TIPS

Traxxas has an excellent reputation for providing high-quality RTR vehicles to first-time R/C'ers. With this in mind, you should feel confident that your Nitro Sport will be built professionally and will function properly. Both versions of the Nitro Sport include exploded-view diagrams covering every major facet of the vehicle and step-by-step operating instructions. The operating instructions include extremely comprehensive engine break-in and tear-down instructions that are supported by numerous photographs and illustrations. I highly recommend that you follow the engine break-in instructions to the letter. The manner in which you break in your engine will determine how well it will perform and how long it will last. Here are a few tips that will allow you to gain more enjoyment from your model.

- Apply a liberal amount of after-run oil to the air filter before cranking up the engine. Never run the vehicle without the air filter installed.
- Be sure to pick up extra glow plugs before you attempt to start the vehicle. The stock glow plug will be toast after the initial break-in has been

completed.

- Glue the tires to the wheels with CA before operating the vehicle. Make a couple of small holes in each tire to allow them ventilation.

- Never operate the EZ Start electric starter for more than 5 seconds at a time.

KIT FEATURES

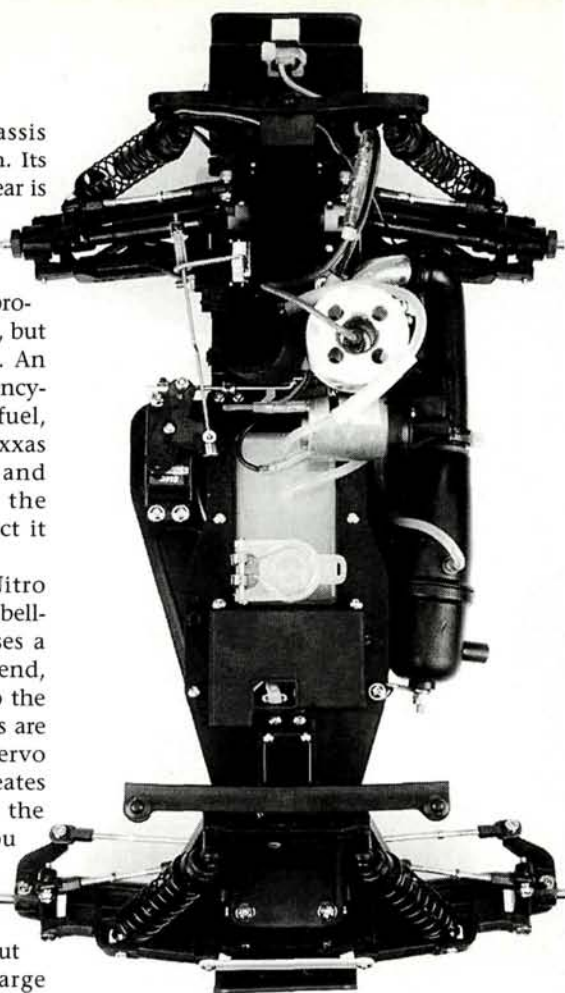
• **Chassis.** A special two-piece chassis serves as the Nitro Sport's foundation. Its front is molded composite, while its rear is made of strong T6 aluminum.

A molded radio box that's secured to the top plate with four machine screws does a good job of protecting the receiver from the elements, but it is not completely moisture-proof. An opening in its top allows easy frequency-crystal changes, but it also allows fuel, water and small debris to enter. Traxxas includes a balloon with every kit and highly recommends that you put the receiver inside the balloon to protect it from moisture.

Unlike the Nitro Rustler, the Nitro Sport does not include a racing-style bell-crank steering system; instead, it uses a simple direct-drive system. At one end, the adjustable tie rods are attached to the steering blocks, while their other ends are installed directly on a large-scale servo saver. Unfortunately, the system creates considerable bump-steer and makes the servo-saver work double time. If you ever notice that the steering is "loose," replace the servo-saver immediately. This system will work just fine for backyard bashing, but if racing on off-road tracks with large jumps and obstacles at every corner is in your future, consider taking a look at the Nitro Rustler instead.

• **Suspension.** The Nitro Sport features a rough and rugged suspension system that's all Nitro Rustler. All four suspension arms are extra-long and incredibly strong. They pivot on stainless-steel hinge pins, and the front hinge pins are supported by a fiberglass brace for extra crash protection.

Plastic, oil-filled, Ultra Shocks smooth the bumps and jumps and are completely rebuildable. Plastic clip-on spacers allow quick and accurate spring pre-load adjust-



Check out the two-piece chassis. The chassis' front end is molded plastic to keep the overall cost down, while the rear is made from T6 aluminum for increased strength and improved heat dissipation.

ments. The extra-rugged molded shock towers should survive even the most horrific crashes, and adjustable tie rods with captive ball ends allow camber and toe-in/out adjustment.

• **Engine and drive train.** The Nitro Sport comes with a 3-gear racing tranny with a

- Always run the vehicle with a slightly rich needle-valve setting, and keep an eye on the engine temperature. The water-drop test is the easiest way to monitor engine temperature: simply place a drop of water on the cylinder head and watch how long it takes to evaporate. If it sizzles away in less than 3 seconds, you're running the engine too lean. Allow the engine to cool for 10 minutes, then open up the needle valve $\frac{1}{8}$ turn and try again. You may need to repeat this step a couple of times to find the "sweet spot" on the needle valve. You may need to make an opening in the front windshield and driver's-side window to increase airflow to the engine.
- Check all the nuts and bolts after each run.
- After the first tank of fuel, check the engine and exhaust system for fuel

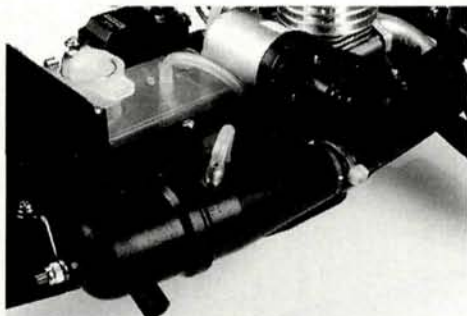
leaks. You can use high-temp silicone or RTV to seal any leaks. I discovered a slight leak where the tuned pipe is connected to the rubber exhaust pipe.

- Stick to low-nitro fuels (10 to 20 percent). Also, never use bargain-basement fuel in your model; stick to the name brands, folks. For the record, I used Traxxas Top Fuel (10 percent) during the test and achieved great results. Traxxas advises that synthetic-only fuels do not contain enough lubrication for successful operation.
- Before you store your model for the night, be sure to put a few drops of good-quality after-run oil inside the cylinder head through the glow-plug opening and inside the carburetor through the venturi. Prather* and Hobbico* offer excellent after-run lubricants.

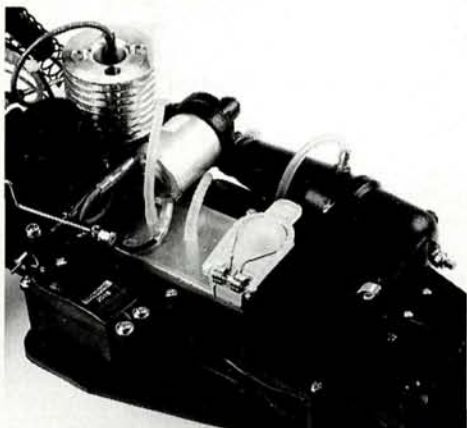
super-low 2.81:1 final gear ratio and bullet-proof planetary gear diff. The internal gears are all 0.580 metric pitch for increased durability. All the gears spin on 5x11 ball bearings, and power is transferred to the ground by means of plastic universal sliders. A 70-tooth, 32-pitch spur gear is included, as is a 20-tooth ball-bearing-supported clutch bell. Unlike the Nitro Rustler, the Nitro Sport does not have a slipper-clutch mechanism: I was a bit skeptical when I first discovered this, but after hours of thrashing, my skepticism vanished. It is comforting to know, however, that Traxxas offers an optional slipper clutch as a low-buck hop-up (see "Factory Options" sidebar).

The Nitro Sport comes with a specially tuned Traxxas TRX 15 engine. Its heat-sink head is slightly smaller than the blue-anodized head on the Pro 15 engine, but it still dissipates heat well.

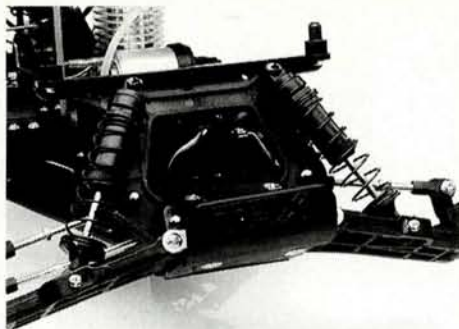
The Nitro Sport engine has a user-friendly TRX-Sport carburetor that does



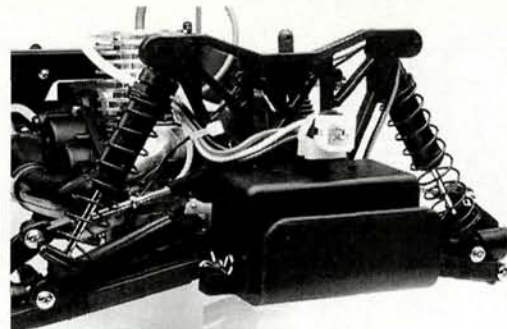
The TRX 15 is a potent performer, but it's slightly less powerful than the Pro engine. It is, however, easier to tune. The composite tuned pipe allows the engine to breathe as it was designed to and provides decent mid- and top-end power. The EZ Start electric starter is a welcome addition and takes all the fuss out of starting the engine.



The center of the chassis reveals many innovative components. The receiver is protected by a molded plastic cover. Behind the receiver is the 75cc fuel tank with flip-top lid and primer bulb. Also note the electric motor for the EZ Start; the wire extending from the center of the heat-sink head ignites the glow plug when starting.



Above left: the front end of the Nitro Sport is all Nitro Rustler. Extra-long suspension arms, big-bore shocks and adjustable tie rods are all standard issue. Above right: here you'll find another set of extra-long suspension arms, even longer big-bore shocks and the same adjustable tie rods. Check out the sealed battery box that protects the receiver batteries from the elements. Yes, the universal sliders are also stock. The four-prong connector is part of the Traxxas EZ Start electric starter system.



not include a bottom-end adjustment screw; hey, that's one less thing to worry about, right? The carb has an air restrictor that gives the engine a broader powerband and a quick throttle response.

The Nitro Sport's high-performance exhaust system includes a cast-aluminum header and a composite tuned pipe. On most other comparably priced nitro vehicles, these are optional upgrades. I've had a lot of experience with Traxxas glow engines, so I can say that the new TRX 15

👍 Likes

- Ready-to-run fun.
- Built like a brick outhouse.
- Extremely fast.
- Great handling.
- Ball-bearing-supported tranny and clutch bell.
- Extremely reliable engine with tuned pipe.
- Love the EZ Start system.
- Cool-looking body.
- Excellent factory support.
- Easy-to-find parts.

• Direct-drive steering system puts a lot of strain on the servo-saver and produces a lot of bump-steer.

👎 dislikes

Series engines are the best powerplants to leave the Traxxas factory!

The Nitro Sport is the first Traxxas vehicle to include the EZ Start electric starting system. Gone are the days of pulling on starter cords or lugging around heavy starter boxes. Heck; you don't even need a glow-plug igniter to fire this thing up. The EZ Start is basically a gear-reduction unit (transmission) that's mounted on the engine backplate in place of a typical pull-start mechanism. A 380-size electric motor powers the unit, and a hand-held control box that uses a standard 7.2V R/C car battery provides the voltage. Just press one button, and the proper voltage is fed to the glow plug and the small electric motor cranks up the engine. A standard 7.2V sport pack will provide over 100 starts on a single charge! I can't tell you how many times I've gone racing only to find that my glow-plug igniter was out of juice; I'm sure

I'll never have this problem again.

ODDS AND ENDS

The Nitro Sport has one of the coolest-looking stadium-truck bodies in the business. Esthetics aside, it's also extremely functional. A giant air scoop in the truck's bed provides tons of airflow. According to Traxxas, under normal running conditions, the airflow that enters under the body will provide sufficient cooling. If you plan to run the vehicle for long periods in extremely hot weather, however, Traxxas recommends that you make an opening on the front windshield to provide additional airflow. I'll take Traxxas' advice, and after the photo shoot, I'll open up the driver's-side window as well. I plan to punish this bad boy!

The Nitro Sport includes an air filter with replaceable foam elements, a 75cc fuel tank with priming bulb and stadium-truck racing rubber. The stock tires aren't exactly competition oriented, but they will provide adequate traction on loose dirt, gravel, grass and asphalt—the stuff backyard bashers usually race on.

The Nitro Sport's cone-dish wheels look great and will accommodate all standard 2.2-inch truck tires. The truck has its own five-piece tool set, so you'll need only a few additional tools to maintain it.

TEST EQUIPMENT

The Nitro Sport is available ready to run, with or without a Traxxas TQ 2-channel radio system installed. Our test vehicle arrived with the radio in place, and Traxxas was kind enough to provide a sharp-looking, custom-painted body, so I was able to get "Thrashing" in a hurry. The clear Lexan body includes die-cut window masks to make painting a snap.

PERFORMANCE

I did most of the "Thrashing" in my front yard and along my street. It's amazing how many adventures you can find right in your own neighborhood with a nitro-powered stadium truck and a little imagination.

The Traxxas EZ Start electric starter system takes all the intimidation out of operating a nitro vehicle. I didn't need to use

(Continued on page 175)

Kyosho *Petit Ten* *Mini Cooper Mk 1*

by Louie Patterelli



WHEN KYOSHO* designed its new Mini Cooper Mk 1, scale realism was the number-one requirement. Using multi-piece molds and chrome-plated accents, Kyosho has crafted a body that would make even the most discriminating scale modelers take notice.

When it comes to scale realism, though, Kyosho didn't stop at the body: the designers set out to create an equally scale chassis. Of course, the chassis would have

to be nitro-powered, and it would also have to be front-wheel drive (FWD) and have the engine mounted up in front where it belongs. Wow!—talk about difficult design parameters!

Well, Kyosho managed to pull it off quite nicely and also gave the 1/10-scale Mini the same legendary performance as its full-scale, two-time Monte Carlo Rally-winning counterpart. Now let's take a closer look at this innovative new gasser.

PHOTOS BY WALTER SIDAS



Kyosho gasses up the classic Mini



s p e c s

SCALE 1/10
LIST PRICE \$299.95

DIMENSIONS
Length overall 13.5 in.
Wheelbase 8.2 in.
Width (F/R) 6.5 in.

WEIGHT
Gross (RTR) 3 lb., 4 oz.

CHASSIS
Type 3-piece plate
Material Aluminum and molded resin

DRIVE TRAIN
Type Sealed gear
Primary Clutch bell/spur
Transmission Dogbone/axle
Slipper clutch None
Bearings/bushings Plastic/bronze bushings

SUSPENSION
Type Lower suspension arm with
molded upper link
Damping None

WHEELS
Type One-piece plastic
Dimensions (DxW) 1.5x1 in.

TIRES
Front/rear Kyosho rubber treaded

POWERPLANT
Engine Kyosho GT-12SCR pull-start
Pipe Kyosho muffler

Kyosho didn't waste a millimeter of space on this chassis! Every nook and cranny is packed with gear. The hoop in front of the fuel tank makes it easy to hold the chassis without touching any hot parts.

THE KIT

Kyosho makes it easy to get started in nitro-powered racing because it ships the new "Petit Ten" GP Mantis Mini FF chassis kit 90 percent assembled. All that's left to do is attach the body mounts, glue the tires to the wheels and install your radio gear. Of course, you also have to paint and detail the body, but that's the fun part. While we're on the subject of bodies, the Kyosho Mini Cooper body is one of the most complete body sets I have ever seen. Kyosho went all out on the details, right down to the chrome door handles and Cooper "S" emblem on the hood. You'll find over a dozen chrome accents included with the body set, and Kyosho even provides lenses for the front headlights and fog lamps. The completed model is so detailed scale modelers would be proud

Where are the shocks?
There aren't any; small springs are built into the suspension arms. You can see them here, wrapped around the inner hinge pins.

to display this car on the same shelf as their static models.

• **Chassis.** The Mini is based on Kyosho's tough and reliable Mantis series. The chassis main plate is stamped out of 2.5mm-thick aluminum that's durable and also an excellent heat sink. The only problem here is that the chassis screw holes are not countersunk. Owing to the car's small size, things are

a bit cramped topside, but I must point out that the car is ingeniously engineered.

The engine fits snugly between the front-mounted gearbox and the bulkhead that houses the fuel tank. Steering is handled by a direct linkage from the steering blocks to the servo-saver, and the servo is mounted directly on top of the gear case. Sturdy, buttress-style mounts hold the throttle servo, and on the right side of the chassis, there's a nifty receiver battery retainer. The front bumper is large enough and stout enough to double as a cow-catcher.

YOU'LL NEED

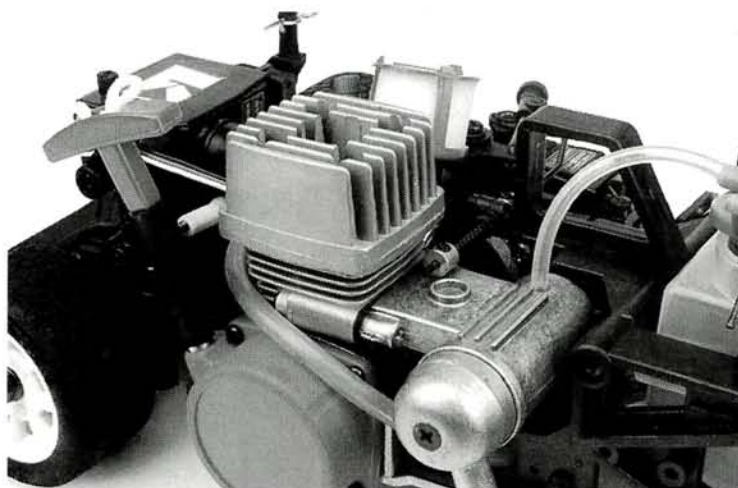
- 2-channel radio w/two servos, receiver, dry-cell holder.
- Fuel.
- Fuel bottle (highly recommended).
- Glow starter.
- Phillips-head screwdriver for assembly.
- Lexan paint.
- Thread-lock.
- CA for the tires.
- After-run oil (highly recommended).

FACTORY OPTIONS

- Shock set—part no. KYOC 4900.
- Shock-tower set—KYOC 5774.
- Ball bearings—PTXC 1638.
- Receiver protector—KYOC 4845 (pink), KYOC 4886 (yellow), KYOC 4887 (green).

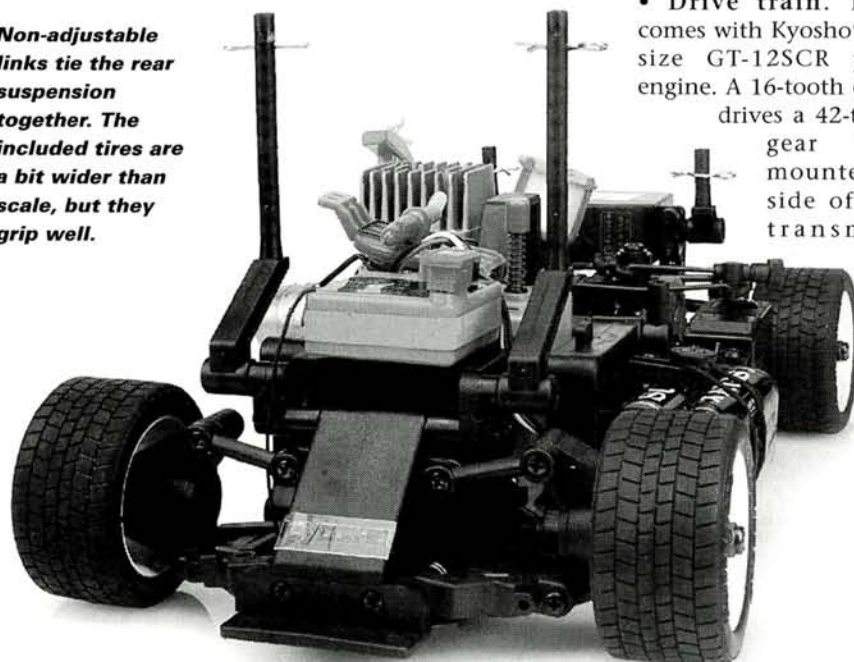
BUILDING & SETUP TIPS

- Since the Mini comes pretty much ready to run, the first thing you should do is make sure that all the screws are tight. Use liquid thread-lock on all the screws that go into metal.
- Nitro-powered cars have to withstand a lot of vibration, so make an effort to insulate your radio gear. Install the rubber grommets on the servo ears before you install the ears on the servo mount. (You still have the rubber grommets that came with your servo, right?) To reduce the vibration that reaches the receiver, double up on the servo tape (Velcro®-brand fastener also works great).
- Never run the engine without the air filter.
- Be sure to glue the tires on the rims.
- When breaking in the engine, follow the instructions. Keep it rich, and keep it cool. Your engine will perform dependably if you follow this simple rule.
- After each thrash session, put a couple of drops of Hobbico after-run oil inside the cylinder head through the glow-plug opening and a couple more drops into the carb's venturi.



Kyosho's GT-12SCR provides plenty of power for the tiny Mini Cooper. The included pull-starter has proved reliable and convenient.

Non-adjustable links tie the rear suspension together. The included tires are a bit wider than scale, but they grip well.



• **Drive train.** The Mini comes with Kyosho's new .12-size GT-12SCR pull-start engine. A 16-tooth clutch bell drives a 42-tooth spur gear that is mounted on the side of a 3-gear transmission.



The Mini Cooper's attractive body features many separately molded parts such as the bumper and taillights seen here.

Inside the gearbox, there's a bulletproof, planetary-gear diff, and the power is transferred to the front wheels via steel dogbones. A drum brake with rubber pad adequately halts the car.

• **Suspension.** Although there are no shocks in evidence, the Mini Cooper does feature a fully indepent suspension system. Inboard springs wrap around the hinge pins to spring-load the suspension arms. Each arm has two setscrews threaded into it. The one on the bottom is used to adjust the ride height, while the one on the top adjusts spring preload. The adjustability is welcome, but the undamped springs should make handling interesting.

TEST GEAR

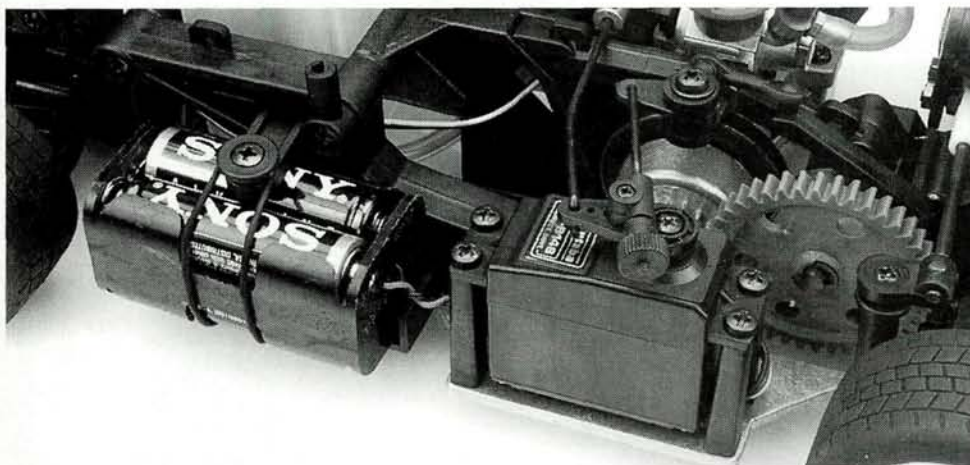
I chose a Futaba* Magnum 3PDF transmitter to operate the Mini; a strong FM signal is a particularly desirable asset when running a gas car, and the 3PDF has all the end-point adjustments you could wish for, making for easy throttle and brake setup. If your budget doesn't allow for an FM radio, Futaba's Magnum Junior is an excellent choice. The

Futaba radio was matched to a Novak* NER-3FM receiver, and two FP-S148 standard servos operated the steering and throttle. Finally, a Hobbico* Hot Shot glow igniter and Dynamite* Blue Thunder 20-percent-nitro fuel kept the Mini humming.



PERFORMANCE

After I had read the engine break-in instructions several times, it was time to start the engine. I turned on my radio, flicked on the receiver switch, set the fuel-mixture screw according to the instructions, attached the glow-plug igniter and then pushed the primer button on the fuel tank a few times while making sure the fuel made it up to the carburetor. Finally, I put my hand on the pull-start and gave it a couple of yanks as memories of an old lawnmower that refused to start ran through my head. The engine immediately sprang to life and settled into a steady idle. After I had given the throttle a couple of raps, the car growled and lurched forward (I wish Kyosho built lawnmowers). During the first four tanks, I took it easy and ran the engine with an extremely rich setting.



A knurled thumbwheel on the brake linkage allows easy adjustment. The molded receiver-pack tray features an O-ring battery retainer—much easier to use than zip-ties.

Likes

- Short time from the box to the road.
- Way cool body—a detailer's delight.
- FAST.
- Great instructions.

- Suspension a little on the bouncy side.
- Exhaust pipe exits too close to the left rear wheel.

dislikes

After each tank of fuel, I leaned the mixture about $\frac{1}{4}$ turn. It took only about five tanks of fuel for the engine to reach its optimum setting. As a safety precaution, I opened up the needle valve an additional $\frac{1}{8}$ turn to ensure that the engine would be given ample lubrication. At this setting, the engine dumped some raw fuel out of the pipe and let out a blue trail of smoke—a sign of proper lubrication.

The Mini's handling can best be described as "nimble," although the undamped suspension is a bit bouncy. The kit tires wear like iron and offer plenty of grip. Unfortunately, the rubber exhaust pipe sprayed fuel all over the left rear wheel, and after a time, this caused the car to hook whenever I made a right turn. I extended the exhaust pipe with a short piece of rubber tubing, and this helped remedy the problem quite a bit.

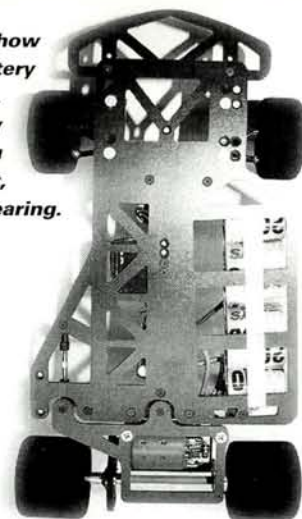
I had originally been concerned that the exposed screw heads would scrape on the track, but the Mini's ample ground clearance (for a road car) prevented any such occurrence. Overall, the Mini accelerates very quickly and reaches respectable top speeds. The engine performs reliably and is easy to start and maintain. The best part, though, is when the Mini zips by at full rpm; it sounds more like a Ferrari 333 SP on the warehouse straight at Sebring than a diminutive Mini Cooper.

FINAL THOUGHTS

If you're new to the hobby and nitro excitement is what you crave, Kyosho's Mini may be right up your alley. I've been doing this R/C thing for a while, and I can only say that Kyosho's Mini Cooper Mk 1 has brought me a new level of enjoyment. I'm a diehard racer, so I'm already thinking about competing with this car in one of the many endurance events that are held in my area. Right now, though, I'm content with banzai speed runs in front of my house. I know that once my friends get a chance to drive this car, I'll soon have some competition on my hands.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.

Here's a look at the underside. Note how much room there is to move the battery pack inward or outward on the chassis. The batteries were mounted all the way to the outside on our test vehicle. You can also see the motor pod's pivot point, which is controlled by a spherical bearing.



Savage Motorsports Headhunter

by Frank Hume

IN THE HIGHLY competitive arena of paved oval racing, it's nice to see the underdog achieve some fame. Such was the case at the '97 NORRCA Winterfest Super Oval in Carson, CA, when the Sportsman Modified class was won by a driver who isn't one of the "factory heroes." Self-sponsored racer Dave Werner from Reseda, CA, captured the checkered flag with his basically box-stock Savage Motorsports* Headhunter HS 300. Savage has taken a page from the "state-of-the-art" book and developed a car that is infinitely adjustable, easy to work on and, ultimately, a good platform to tune on. You'll probably see a few Headhunters in the winners' circle in the near future, but don't worry; although the Headhunter may be fast, it isn't a cannibal.

KIT FEATURES

The Headhunter HS 300 kit comes complete with all the trick parts: Team Associated's Dynamic front suspension; Irrgang Racing Service's (IRS) killer diff and hubs; aluminum motor pod; Kimbrough spur gear and servo-saver and lots of graphite. All the graphite is beautifully cut from stout .110-inch plate material. In fact, all the components are topnotch.

- **Suspension.** In front, Associated's molded-carbon, tried-and-true Dynamic Strut suspension with .022-inch springs allows the tuner to make accurate caster and camber adjustments. The Dynamic Strut suspension is extremely user-friendly and is a perfect match for the Headhunter's racing-oriented platform.

In the rear, the motor pod and axle assembly pivots on a centrally mounted, spherical bearing and is supported by a drag link on the right side. A Delta shock equipped with an extension tube provides the

fore and aft damping, while two smaller Delta shocks provide lateral damping. This makes a rear suspension that's fully adjustable, not only by varying springs and shock oil but also by tuning the rear roll steer with the drag link. Kimbrough axle spacers are included to make wheelbase and ride-height adjustments.

TEST GEAR

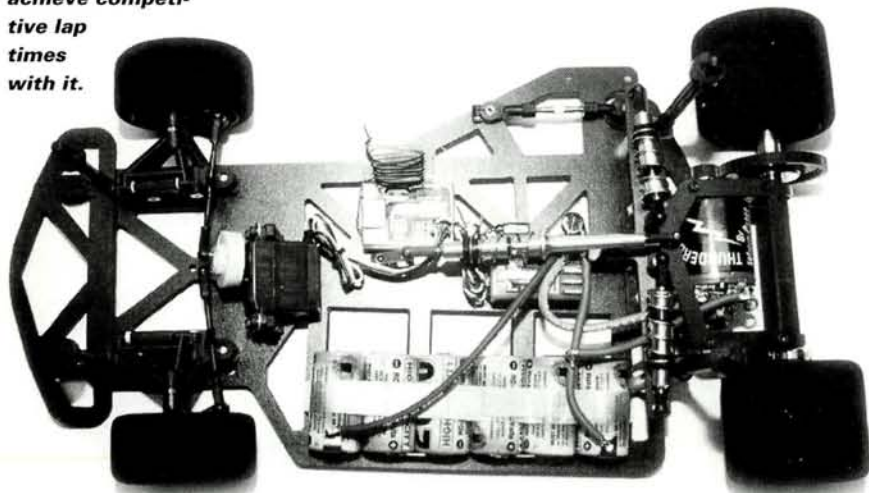
I outfitted my test car with some state-of-the-art racing electronics. I chose a Novak* Cyclone speed control and Mercury FM 2-channel receiver. The Cyclone ESC features programmable drive parameters that are invaluable to oval racers, and the Mercury receiver is virtually glitchproof. A lightweight, fast Futaba* 3002 miniservo handled the steering. Power came from World Class* with some Spiked RC 2000 cells with killer numbers and an absolutely vicious 11-turn Thunderbolt motor. My radio of choice was an Airtronics* Caliber 3PS.

The Parma/PSE* tires (Blue Star on the rear and right front, and standard Green compound on the left inside) were mounted on Parma's new Velocity wheels under the realistic Taurus body. Of course, I saved the show body for the photo shoot. Scott Bich from Bich'n Bodies* painted the body in a Ford Quality Care racing theme. Scott used a combination of Parma, Autographics* and Slix* decals to detail it. I bet that many of you aren't aware that Scott is an auto-body-shop manager and actually custom-paints real cars.

PERFORMANCE

Now for the fun part, when I take the car down to the local track and wear it out. Wow; does this car turn! I went through three sets of tires and two sets

As you can see from this overhead view, the Savage Motorsports Headhunter is a serious oval contender. With a little practice and tuning, even average racers could achieve competitive lap times with it.





s p e c s

SCALE 1/10
LIST PRICE \$399.95

DIMENSIONS
Length overall 13.5 in.
Wheelbase 10.1 to 10.5 in.
(adjustable)
Width (F/R) 7.25/7.75 in.

WEIGHT
Gross, RTR 42.7 oz.

CHASSIS
Type Flat pan
Material Graphite

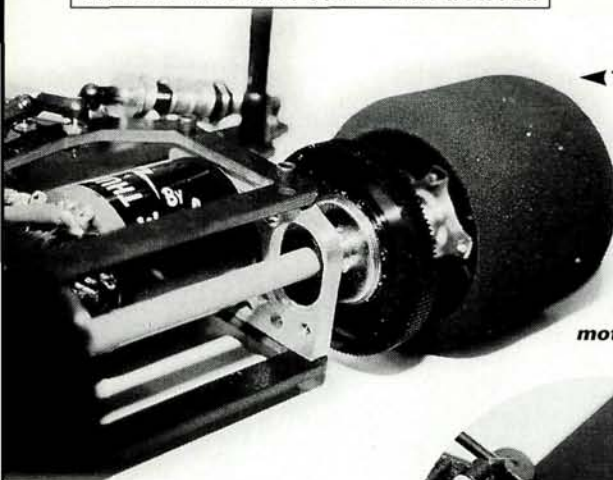
DRIVE TRAIN
Type Direct drive
Primary Pinion/Spur
Differential Ball
Bearings/bushings Bearings

SUSPENSION (F/R)
Associated Dynamic
Strut/straight axle
motorpod
Damping Coil springs/triple
oil-filled shocks
Wheels Not included; requires
standard 1/10-scale
on-road wheels
Tires Not included; requires
standard 1/10-scale
foam tires

ELECTRICS
Motor, battery, ESC Not included

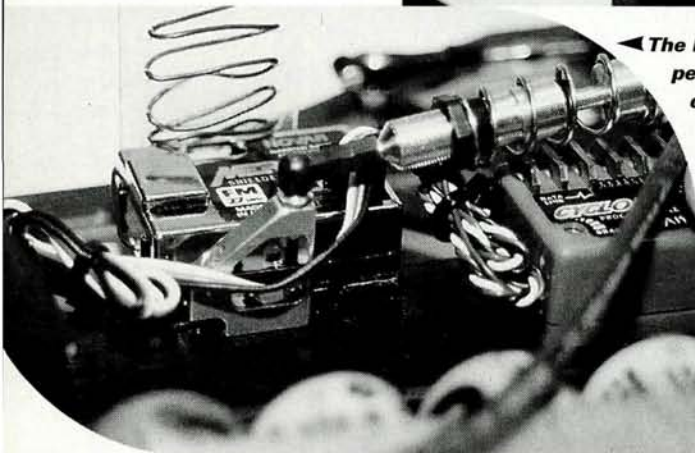
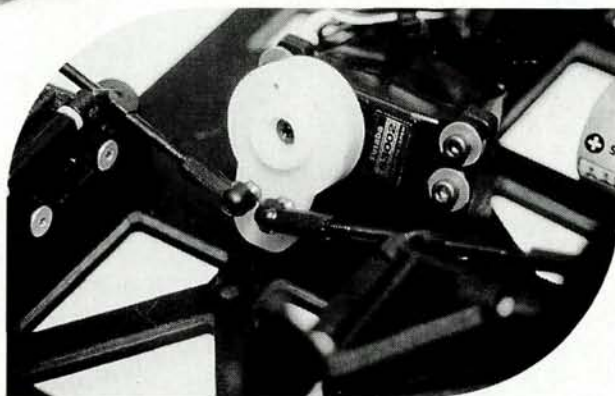
out-of-the-box

OVAL CONTENDER

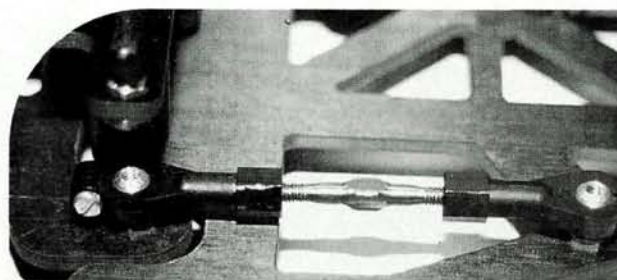


◀ The IRS fiberglass axle and silky-smooth diff are standard issue. The Kimbrough spur gear and light-weight aluminum hubs are also included with the kit. If you squint, you can see the Kimbrough adjustable axle spacers that allow you to alter the wheelbase. The World Class Thunderbolt modified motor is as stout as they come.

▶ A tiny but mighty Futaba S3002 servo kept my car on track. Associated's Dynamic Strut front suspension graces the front end of the Headhunter.



▶ The Novak Cyclone fits perfectly under the center shock. Note the aluminum shock mount. The antenna is not under the body for esthetics; it is there to cut down wind resistance.



▶ A single adjustable drag link supports the rear motor pod and allows subtle roll-steer adjustment.

YOU'LL NEED

- 2-channel radio system with one servo (mini high speed recommended).
- 6-cell, side-by-side battery pack.
- Battery charger.
- ESC.
- Motor.
- Body and paint.
- Tires.
- Pinion gear..

BUILDING & SETUP TIPS

- Ream the mounting holes on the Associated front suspension arms with an 8-32 tap prior to assembly; installation and caster adjustments will be easier.
- Before putting the chassis together, sand the edges of the chassis pieces—particularly the battery slots—with some 600-grit wet-and-dry sandpaper to remove any sharp edges.
- Use good-quality shock oil like Associated 100-percent silicone for the shocks.
- Novak recommends that you place three pieces of servo tape under the Mercury receiver to cut down on vibration. The receiver should be mounted on its side with the frequency crystal facing up.
- The Headhunter performs best with the battery pack mounted all the way to the left.
- Install a foam front bumper on the vehicle. This will help protect the body and the chassis.

THE COMPETITION

	Savage HEADHUNTER	Hyperdrive/PTI SSE	Trinity SWITCHBLADE	Associated RC10L20
Wheelbase	10.1 to 10.5 in.	10.25 in.	10.5 in.	XX
Width (F/R)	7.25/7.75 in.	7.2 in./7.85 in.	7.25 in./7.75 in.	8 in.
Weight	2 lb., 6.7 oz.	2 lb., 10.5 oz.	2 lb., 10 oz.	2 lb., 13 oz.
Diff type	Ball	Ball	Ball	Ball
Chassis	Graphite	Graphite	Graphite	Graphite
List price	\$399.95	\$285.95	\$299.99	\$260
Available at	NA	NA	\$189.99	\$139.99
Reviewed in	—	—	—	7/97

*Prices vary with location.

of motor brushes before I had this car completely dialed. Although the setup I used for our outdoor flat asphalt track worked fairly well, the chassis needed heavier center and side springs and thicker oil in the side shocks. I settled for 40WT in the center shock and 80WT in the side shocks.

Tire stagger started at .050 inch for both outside tires, and the chassis was set with a flat tweak in the front (equal weight on left and right front wheels). The Taurus body

provides plenty of turn-in steering and felt very stable on the straights. Traction off the corners was excellent, and the car behaved quite well. On this particular flat track, I found that the chassis responded well to changes, and that's a sign of a stable, stiff platform.

FINAL THOUGHTS

Look out oval racers because there's a new predator lurking, and it's called the Headhunter HS 300. Savage Motorsports has

Likes

- First-rate parts.
- Easy assembly (can be built in about 8 hours.)
- Extremely adjustable chassis.
- Excellent suspension.

dislikes

- Instructions could be better.
- Chassis wing mounts not included.

produced a car that doesn't require "factory" driving skills to win races and includes plenty of hop-ups as stock equipment. All that are required to win that big trophy are some time, tuning and patience. Who knows; the Savage Motorsports Headhunter HS 300 could be your ticket to the A-main!

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.



2ND KYOSHO WORLD CUP

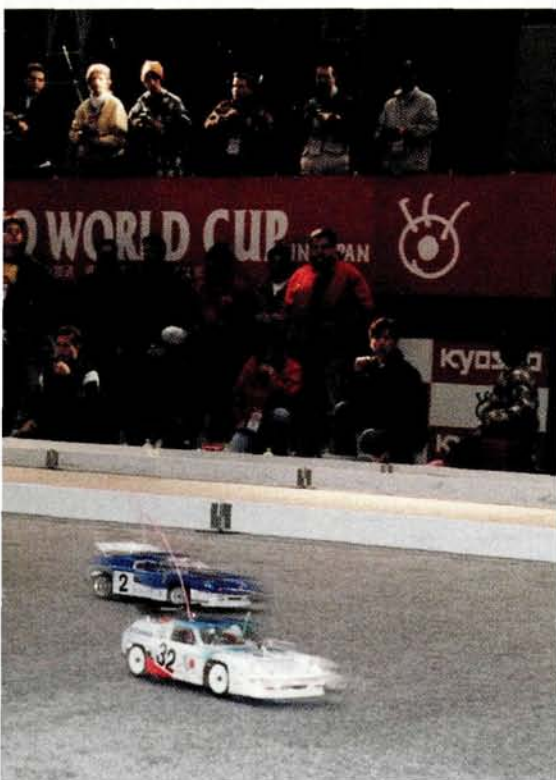
story and photos by Chris Chianelli



Pure Ten takes Tokyo

T'S THAT TIME again—time for my favorite race of all: Kyosho's World Cup Finale, which, by the way, also gets my butt out of the

cold, wet Northeast. I find this event extremely fair, efficiently run and realistically exciting.



Above: Kyosho rented an entire trade-show hall (I think "hangar" is more appropriate) at the Big Site Convention Center to hold the event in. It was impeccably kept and well ventilated. Left: the winning teams with the winning magazine (left to right)—third-place Japan-C, first-place Finland, second-place Germany.

This time, the Ferraris, Cobras, Lotus Europas, Ford GT-40s, Corvettes and Porsches were pulled out of their shipping cases in Tokyo, Japan. Like last time in the Philippines, Kyosho's race organization and welcoming committee made the racers feel valued. We were all accommodated in the beautiful A.N.A. Hotel in the lively Roppongi section of Tokyo. Roppongi is considered the "night life" part of Tokyo—much like Times Square is to Manhattan, only cleaner—much cleaner.

And the girls? Angels from all parts of the Asian world. I loved it, and so would you.

THE RACE PLACE

The race was held at the ultramodern Big Site on Tokyo

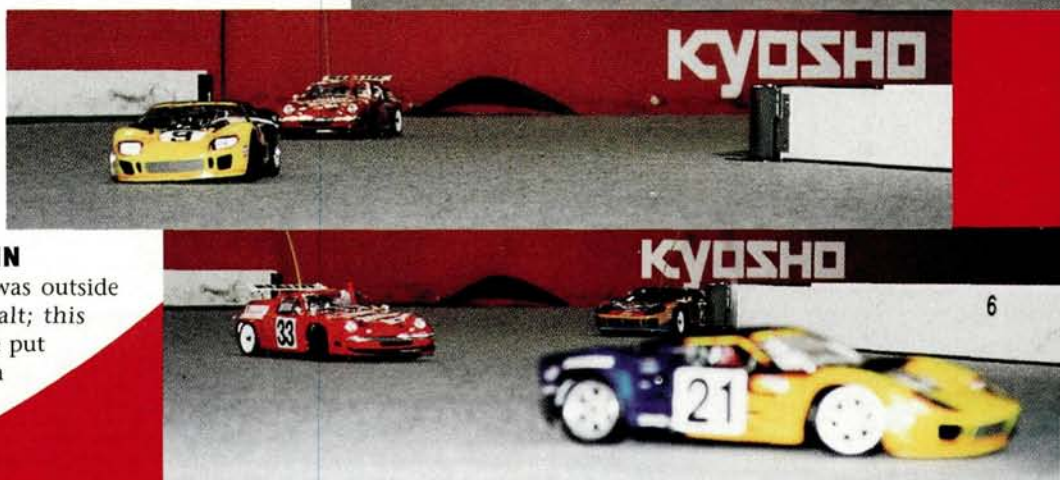
The man whose vision and tenacity made it all possible—Kyosho President Mr. Akihisa "Aki" Suzuki. From all of us who love a fair and fun race: Domo arigato, Aki-san.



Bay. At the center of the convention complex—a trade-show center/shopping mall with lots of places to eat—is a building (or should I say "structure"?) that looks more like a Borg spacecraft than a building; it can be spotted from miles away. Also going on at the time was a huge aftermarket performance show; Tokyo's street are full of young, street-racer types, so the Kyosho World Cup event was always well-attended by car enthusiasts.

WARMIN' UP & DIALIN' IN

Last year in the Philippines, the track was outside and the surface was sun-warmed asphalt; this year, however, the Pure Ten chassis were put to the test on a huge indoor layout and a surface of cold carpet. A racer never



R/C Olympics

Only in Nagano did the lists of participants rival the Kyosho World Cup teams list in their international diversity. From Canada to Malaysia to Turkey to Taiwan, the CD's roster read like an Olympic event and, in a way, that's exactly what it was.

All year, these drivers had competed in their native countries around the globe, and this was it—the climax here and now in this Asian metropolis.



The Lotus Europa body certainly did well in Tokyo. For those who may not know, in the early '70s, the Europa was powered by a 1600cc Renault 17 4-cylinder pushrod engine. Later, a higher-performance John Player Special (JPS) version was offered with a much improved suspension and a dual-overhead-cam 2-liter Cosworth in-line four. Either way, the Cobra Daytona, Ford GT-40 and other full-scale cars in Kyosho's Nostalgic Series would have blown it in the weeds in first gear. • Left: the France-B team took home concours honors with their Europa, while the first-place Finnish team and others also got the Europa to handle very well indeed.

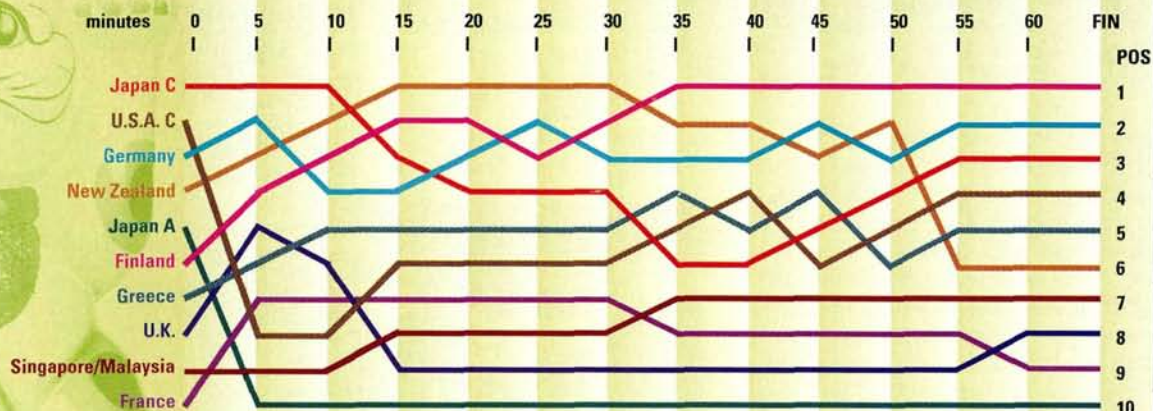


This has to be one of the most revealing printouts from a timed lap-counting computer program I have ever encountered. The laps of each car were recorded every 5 minutes and plotted accordingly. You can plainly see how having to restart a cranky engine or having a mishap or a crash that makes minor repairs necessary can screw up your entire race, even if it is an hour long.

On the other hand, you can see how the Finnish team started out in sixth position and worked their way to a victory with consistent, smooth driving. The German, USA and other teams turned in faster laps than the

Finns, but a lot of good that did them. You can see how Japan-A, USA-C and the United Kingdom teams had costly mishaps in the first 15 minutes of the race, while New Zealand—a strong runner for the first 50 minutes—had fatal losses somewhere between the 50- and 55-minute marks. Conversely, the Finnish and German teams were consistent. The Germans were fast, but had three "loss events" during the race. The cool, smooth-driving Finns, however, showed constant gains throughout and had only one area of slight loss to the Germans at the 20- to 25-minute mark. This, my friends, plainly illustrates how races are won.

The final hour





knows for sure what he will face. That notwithstanding, the cars eventually did get dialed in nicely.

At first, traction was a problem that was helped somewhat with suspension tuning. Also, as an hour or so of practice time passed, the track actually seemed to form off-road-type blue grooves (if you don't mind me stretching the term a bit). Castor oil from exhausts accumulated along the driving lines and congealed slightly on the very cool track to create a relatively sticky surface. Somewhat surprisingly, the cars started

to handle quite well in short order.

What was handled less well—at least, by me—was the indoor lighting. There was plenty of light for the drivers, but there's nothing like bright sunshine for those colorful racing action shots. As you can see, however, I coped.

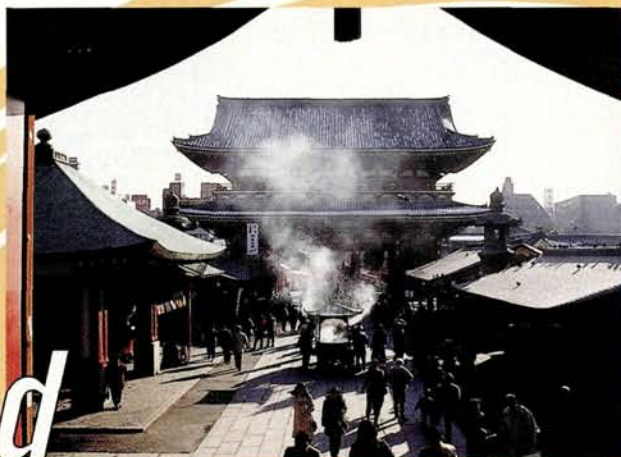
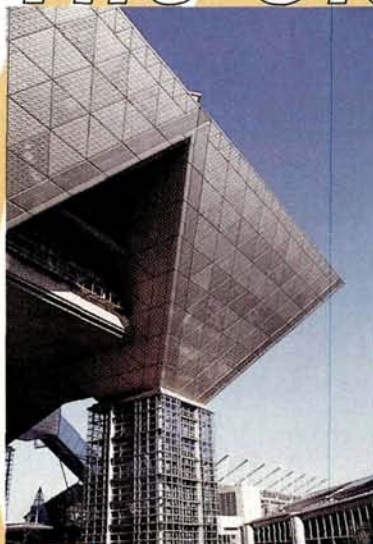
Anyway, it wasn't all that long before the cars started to really hook up. By the end of

(Continued on page 100)

Tokyo is a city of the old and the new; true, many cities fall into this category, but Tokyo isn't like any other place I've ever been to. The ancient and the ultra-modern not only peacefully coexist there, but actually seem to complement each other!

The Japanese are numero uno when it comes to what I call "architectural symbiosis." In the morning, I'd descend in an elevator sporting "Terminator" decor, having Plexiglas walls so the underlying servos, switching grids and stainless-steel wiring conduits were a visible part of the design. Then, in the afternoon, I'd be at a Buddhist shrine waving incense onto myself, and it didn't seem a bit incongruous. How the Japanese get such "environmental *non sequiturs*" to flow, I may never know! Tokyo is a city in which "Star Trek"'s Mr. Spock and "Shogun"'s Lord Toranaga would be equally at home—a totally cool place.

The Old



& the New

Fuji Television Network was a major sponsor of the 2nd Kyosho World Cup. This is their wild building adjacent to the monorail line that led to the Big Site.





Kyosho's Quest for Fairness

Kyosho World Cup racing was designed to encourage average R/C enthusiasts to get involved in a racing series in which they have a chance to win a fairly significant prize and travel to exotic places all over the world. In the past two years, Kyosho has helped 20 racers—men and women—realize their dream of competing in the Philippines and Tokyo, Japan. In October of 1999, Kyosho will help 16 more amateur racers travel to the Big Island of Hawaii for the 3rd Kyosho World Cup.

Recently, at the San Jose, CA, race sponsored by Castle Hobbies, two Kyosho A-team drivers showed up to compete in the GP Spider class. They were not sponsored in that class, and they had purchased their cars and parts on their own and at their own expense.

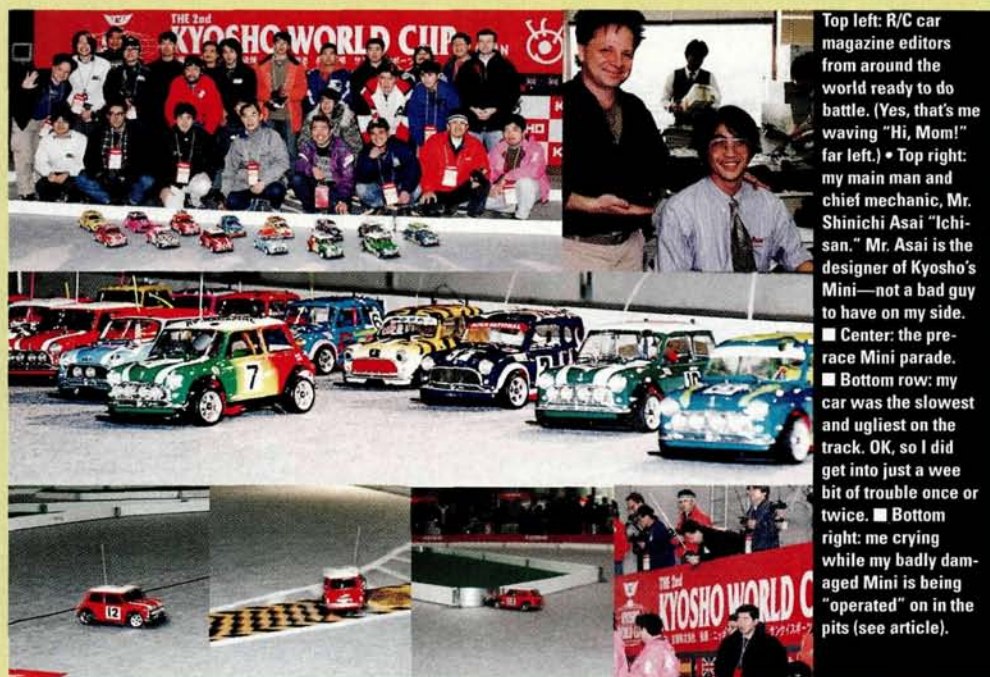
It was decided that they should be allowed to compete, since technically, the rules didn't say that they weren't eligible. They won and were each awarded the prize of an all-expense-paid trip to Tokyo, Japan, to race in the finals. Sometime shortly afterward, the Kyosho World Cup executive committee ruled that the top prize should go to the second-place team so that the "spirit" of the race would remain consistent with the goals of Kyosho and Great Planes Model Distributors.

This year, they have eliminated the loopholes in the rules so that everyone will find it easy to understand the spirit of Kyosho Cup racing. Also, there's a new set of rules that are even more concise and clearly stated than the previous ones.

Excerpt from the updated local and regional race rules:

All of the following are ineligible and cannot participate in Kyosho World Cup local and regional races:

- Kyosho-sponsored drivers; race organizers; employees of Great Planes Model Distributors and its wholly owned subsidiaries.
- Any employee of the sponsoring hobby shop or any other hobby shop that purchases products from Great Planes Model Distributors.
- Participants in any previous Kyosho World Cup finals in Japan or the Philippines.
- Any driver who has qualified in the A-Main of a ROAR or NORRCA Factory Drivers Class national event in the past two years.



Top left: R/C car magazine editors from around the world ready to do battle. (Yes, that's me waving "Hi, Mom!" far left.) • Top right: my main man and chief mechanic, Mr. Shinichi Asai "Ichi-san." Mr. Asai is the designer of Kyosho's Mini—not a bad guy to have on my side. ■ Center: the pre-race Mini parade. ■ Bottom row: my car was the slowest and ugliest on the track. OK, so I did get into just a wee bit of trouble once or twice. ■ Bottom right: me crying while my badly damaged Mini is being "operated" on in the pits (see article).

Media Mini Race

Stay on the track. Stay out of trouble.

New to the Kyosho World Cup Finale was the Media Race. Representatives of the 14 attending magazines were pitted in a 45-minute enduro racing box-stock Nitro Mini Coopers. Five of the 14 teams were from Japan (Japanese magazines are noted to be staffed with avid racers). The competition was stiff.

Before I left the States for Japan, Gordon Cockburn III (Gordi-san), Great Planes marketing director, told me that I was signed up for the race and that a car was being built and tweaked for me. To make a long story short, the person who was to carry my broken-in, dialed-in Mini from the States to Japan was taken ill, and I had no car to race. Well, to Mr. Aki Suzuki, Sacho (president) of Kyosho, this situation was totally unacceptable. Sacho-san turned to me and said, "No, no, no! You must race. You will race!" Then Mr. Aki turned to his staff with, "You will build Chris-san a car—now!" They had one hour before the starting buzzer! Mr. Shinichi Asai (Ichi-san) accomplished this feat in an amazing 28 minutes! (Gee; do you think it helped a bit that he's the designer of the Mini? I think so!)

Well, my story is in danger of getting too long, so let's just say that with a brand-new engine that was tight and running a bit hot, I had the slowest car in the entire field. Cars passed me in the straight so fast that when they passed very close, my car spun like a top—kind of like cars in the old "Looney Tune" cartoons. But, you know what? I really didn't care. I was having way too much fun just staying on the track and keeping out of pileups. And that's the secret, my friends. Don't get flustered by a passing car; just stay on the track and stay out of trouble.

After 20 minutes or so, my engine was starting to

come on, I was going faster, and things were looking very good for me: I was in third place. How did that happen?!

My only trouble was missing one refueling pit stop. As a result of this, my car died and had to be run back to the pits, but I lost only one lap. My car continued to improve its lap times, and things were looking really great Suddenly, big trouble found me. I was T-boned so badly on the straight that my front steering knuckle broke in two and a front drive wheel broke off. Mildly dejected, I was collapsing the antenna when I saw Mr. Manabu Mizota, Kyosho R/C Group staff member and my new best friend, running back to the pits with my car. He handed the car to Ichi-san (remember him?—the guy who designed the Mini), who had my car repaired and back in the racing action in an incredible 6 minutes! It helps to have the Kyosho factory guys as your pit crew.

I had lost about seven or eight laps, but we still had 12 minutes to go. I had to see how far I could climb my way back. As the end neared and glory fever built, cars crashed all around me while I stayed out of trouble for the final 9 minutes.

I placed fifth in a 14-car race with an un-tuned car and a slow engine. Had I not lost the 6 minutes, the officials told me I would have taken third for sure, possibly even second.

OK; here's the point: at the very best, I'm only an average driver, so if "Stay on the track; stay out of trouble" can work for me, imagine what it can do for you. The wise guy who blasts by you on the straight will, sooner or later, blast right into a wall, and you'll cruise by while he's screaming at the track marshals.

Shown in the photos at right are Kyosho's race management, coordination and support people; they were truly organized, very professional and, above all, super friendly.

Top center: me with my Tokyo guide, driver and now friend, Manabu Mizota from the Kyosho R/C Car Group. Mr. Mizota showed me the hottest spots of the Tokyo nightlife. Thanks, Mabu-san.



(Continued from page 98)

practice time, it was scaled-out classics drifting through sweepers and hard braking into hairpins—all while leaving those cool blue exhaust trails. Even in the first pre-qualifying heats, it was close competition packed with tight fields, multi-car bat-

with 10 teams in each. At the end of it all, it was the Japan-C team in the pole position with the USA-C team in second for the final. At this point, I should try to relate just how the final went, but Kyosho ran this awesome program, and their results printout clearly tells the story better than I ever could. Refer to the "Final 60 Minutes"

sidebar for the picture (graph) that tells the story. Let me just say that Saturday's heats and Sunday's semifinals and final all went very professionally.

I WANNA GO BACK!!

Kyosho's World Cup truly is a success story. The close competition, the almost nonexistent complaints and the general

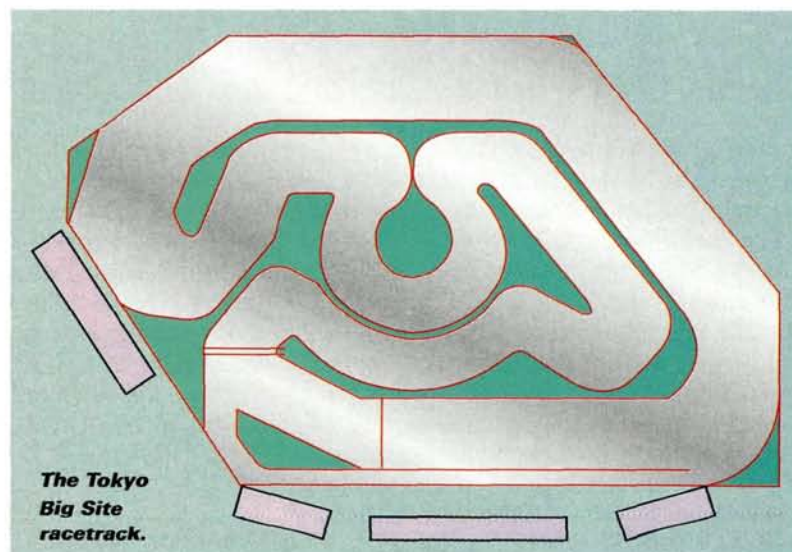
enthusiasm of the contestants—regardless of finishing position—prove one thing: the rules and strictly enforced modification regulations are very fair and work to the benefit of all.

Kyosho gives us a visually exciting scale event in which driving skill pays off as it should. What a combo! This, in my humble opinion, we need more of!

I said it last year, and I'll say it again: I want to go to the next Kyosho World Cup, Aki! Oh, by the way: the next one will be held in Hawaii. Gee; do you think that has heightened my enthusiasm?

More Film!!

On Saturday, while the drivers were all eating, El Presidente Aki Suzuki suggested we take a walk to check out the huge, full-scale after-market auto show going on across the mall promenade a few hundred yards from the R/C site. The Japanese are very into wildly modifying their Skylines, Hondas, Supras and anything else you can imagine. Aki looked me squarely in the eyes, raised one finger and said, "You must bring lots of film." While the auto show featured everything from a turbo Bentley covered with louvers to Acura NSX-type concept cars, Aki knew what I'd be taking pictures of. Never have I seen so many exotic beauties in one place at one time. I would have loved to show them all to you, but that wouldn't have left any space for the race. Rest assured, I didn't leave till I ran out of film.



tles for position and scale machines doing "leaning dives" for the best line. Once again, Kyosho's strictly enforced rules ensured evenly matched competitors—a mandatory ingredient for exciting racing.

ACTION ... CAMERA ... AWESOME!

Here's how the race is run. All 33 teams run in two, 5-minute "time-attack" pre-qualifiers. The best of these two rounds is saved and used to position all the teams in the next 15-minute qualifying heats.

The teams are narrowed down to 20, and there are two semifinal runs



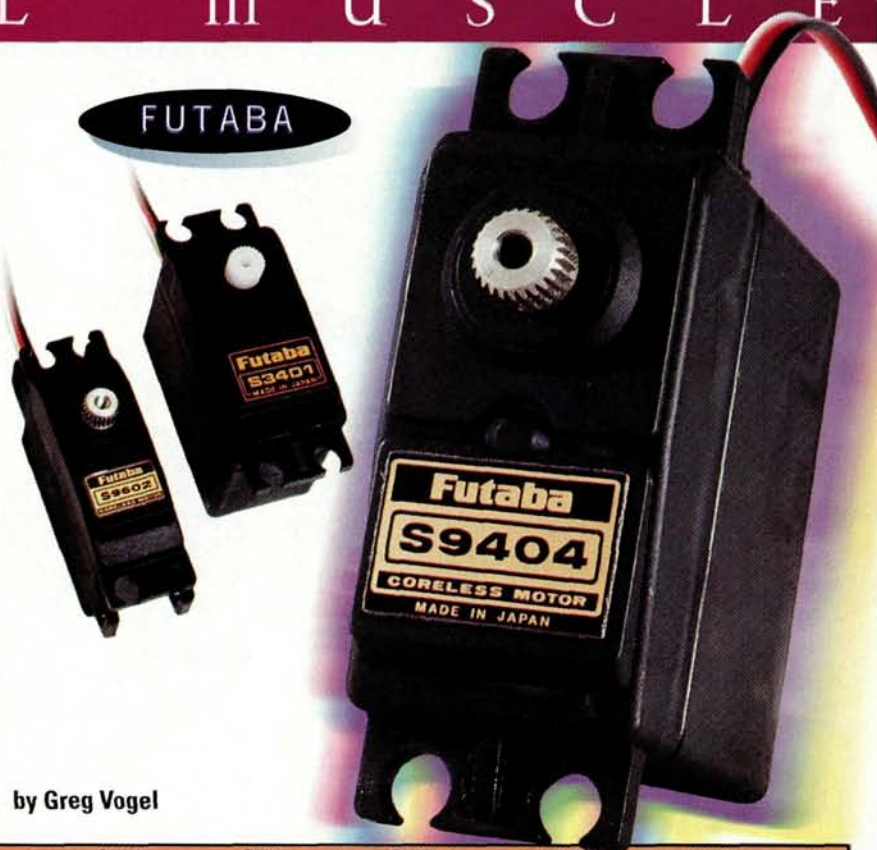
RACING SE

MODEL MUSCLE

Some parts have all the luck. Nitro engines literally whine for attention. Bodies get all the looks. Carbon-fiber chassis are lusted after. Hot ESCs get their buttons pressed. Meanwhile, the lowly servo yanks linkages in the shadow of all the cool stuff, merely a black box amid the colored baubles.

Though they're unassuming in appearance, you shouldn't underestimate the importance of those black boxes or the contributions they make to your vehicle's performance. No matter how you've hopped up your car's suspension, a lazy steering servo will sap the responsiveness from your car's handling, and even the brawniest brake pads are powerless to stop a screaming gas car if the throttle/brake servo is a flyweight model.

But how do you pick the right servos for your car? They all look about the same; only model numbers and size distinguish one from the other. This looks like a job for *R/C Car Action*! We've gathered the newest crop of wheel-turners and throttle-openers from Airtronics, Cirrus, Futaba, Hitec, Hobbico, JR Radio and KO Propo, put down all their specs and added plenty of extra info to help you use the data to choose a servo to suit your needs.



by Greg Vogel

Part no.	S148	S3002	S3003	S3302	S3401	S9101
List price	\$39.95	\$109.95	\$29.95	\$109.95	\$89.95	\$109.95
Type	Standard	High-torque mini	Standard	Large scale	High-speed	High-speed standard
Torque (oz.-in.)	41.7	45.8	44.4	111	44.4	43.1
Speed (sec.)	0.22	0.16	0.22	0.19	0.15	0.16
Bearing	One Oilite	Dual BB	One Oilite	Dual BB	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.59x0.78x1.42	1.22x0.63x1.19	1.59x0.78x1.42	2.33x1.13x1.96	1.54x0.79x1.47	1.52x0.77x1.36
Weight (oz.)	1.5	1.23	1.3	3.6	1.66	1.59
Gear type	Nylon	Metal	Nylon	Metal	Nylon	Nylon
Operating voltage	NA	NA	NA	NA	NA	NA
Application	Gas/off-/on-road	On-road	Gas/off-/on-road	Gas/off-/on-road	Gas/off-/on-road	On-road
Part no.	S9102	S9303	S9304	S9402	S9404	S9602
List price	\$134.95	\$124.95	\$109.95	\$159.95	\$124.95	\$124.95
Type	CL	High-torque	High-torque/CL	High-torque/CL	High-torque/CL	High-speed/CL
Torque (oz.-in.)	50	100	69.4	111.1	79.2	37.5
Speed (sec.)	0.13	0.19	0.22	0.09	0.11	0.09
Bearing	Dual BB	Dual BB	Dual BB	Dual BB	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.59x0.79x1.48	1.59x0.79x1.56	1.59x0.79x1.40	1.59x0.79x1.48	1.54x0.79x1.47	1.41x0.59x1.47
Weight (oz.)	1.60	2.28	1.76	1.94	1.94	1.09
Gear type	Nylon	Metal	Nylon	Metal	Metal	Nylon
Operating voltage	NA	NA	NA	NA	NA	NA
Application	Gas/off-/on-road	Gas/off-/on-road	Gas/off-/on-road	Gas/off-/on-road	Gas/off-/on-road	On-road

There's a lot more to choosing a servo than finding a unit that fits your car and your budget. Here's what the servo specs refer to and why they're important:

Application: Although the servo manufacturers recommend uses for their products, these are only guidelines. If the specs seem to show that the servo will work for you, but your application isn't listed, don't worry. As long as the servo fits in your car, you should have no problem.

Bearings: More expensive servos often use ball bearings to support the output gear. The bearings decrease friction, allowing the

servo to operate more efficiently and to return to center with greater precision. Some servos use two ball bearings—one on each side of the gear—while others use a bushing on the bottom and a bearing on top.

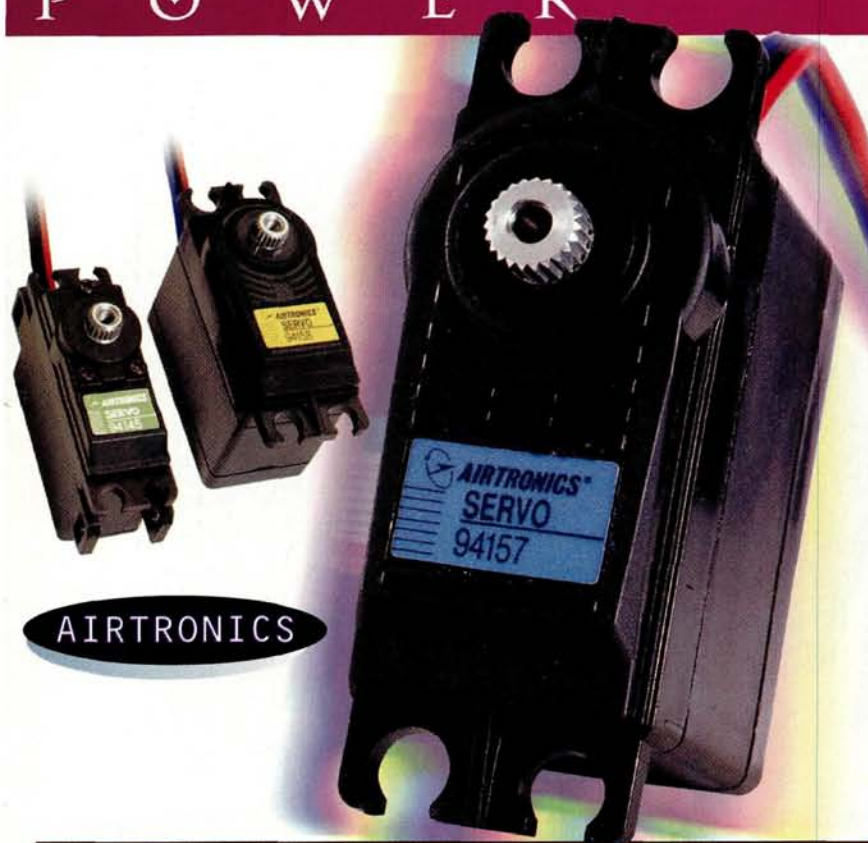
Gear type: The inner gears of a servo are constructed of either metal (aluminum or brass) or plastic (resin). Few servos feature all-metal gears; most have a combination of metal and plastic. Which is better? See the section "Metal Gears vs. Plastic Gears" for more information.

Operating voltage: This is the voltage that was used to operate a servo when the fig-

ures for torque and transit time were generated. Here's why voltage is important: a servo will operate with greater torque and speed as voltage is increased. If a servo produces 40 oz.-in. of torque at 4.8 volts and another produces 40 oz.-in. at 6 volts, they do not have equal torque; the servo that produced 40 oz.-in. at 4.8 volts will be even stronger at 6 volts. If your car features a racing ESC, it probably delivers 6 volts to the receiver and servo; sport-type ESCs may provide less. If you run a gas car with a receiver battery, four alkaline batteries will deliver 6 volts. If you use Ni-Cds, however, you'll need 5 cells to get 6 volts. Just remember that

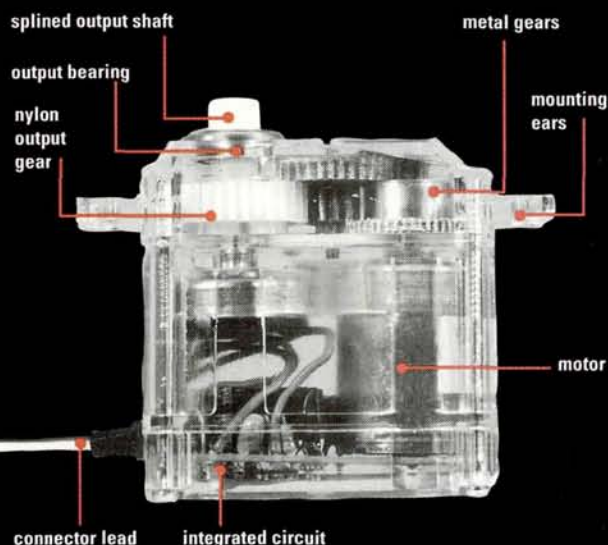
R V O G U I D E

P O W E R



AIRTRONICS

Inner Works



This servo's transparent case allows us to see its workings. Note the reduction gears along the top of the case; these gears turn the high rpm of the servo's motor into torque. The fine-tooth gears are constructed of metal to reduce the chances of them stripping. The servo pictured, a Cirrus CS-80, includes the clear case as stock equipment.

METAL GEARS vs. PLASTIC GEARS

You've probably noticed that the servos mentioned in this guide have gears made of metal or a plastic material. The type of vehicle you drive should dictate which type of servo you choose.

- **Metal-gear servos.** These are better for harsh conditions such as $\frac{1}{8}$ -scale gas racing and big-wheel monster trucking, but they work great in most $\frac{1}{10}$ -scale applications as well. They're more resilient than plastic-gear servos, so they're a popular choice for $\frac{1}{10}$ -scale gas truck racing. In the past, the metal gears were made of brass and had a tendency to develop backlash (play) sooner than plastic gears. However, the alloy gears used by newer servos have cured the problem.

- **Plastic-gear servos.** Even expensive pro-level servos may have plastic gears, as they have their own unique advantages. They weigh less than their metal counterparts and generally operate more smoothly and quietly. Saving a gram or two is an advantage in $\frac{1}{12}$ -scale racing where every little bit counts. Since that weight savings comes from rotating parts, plastic-gear servos are often faster than similar metal-gear designs. The result is quicker steering response without an increased amp draw. It is for this reason that plastic gears are usually found inside high-speed servos. They're also less inexpensive than metal gears, and that's a big advantage if you ever have to order replacements.

Some of the servos mentioned here feature a combination of metal and plastic gears that provides the best of both worlds: the rock-hard resilience of a metal-gear servo and the speed and smoothness of operation of a plastic-gear servo.

Part no.	94102	94145	94257	94258	94161
List price	\$39.95	\$99.95	\$179.95	\$179.95	\$114.95
Type	Standard	Micro/CL	High-speed/CL	High-torque/CL	Large-scale
Torque (oz.-in.)	50	33	110	145	135
Speed (sec.)	0.22	0.07	0.06	0.09	0.25
Bearing	None	Single BB	Dual BB	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.54x0.79x1.42	1.42x0.60x1.29	1.54x0.79x1.48	1.54x0.79x1.48	1.54x0.79x1.65
Weight (oz.)	1.59	1.11	2.07	2.10	2.5
Gear type	Nylon	Aluminum output	Aluminum	Aluminum	Metal
Operating voltage	4.8	6	6	6	6
Application	On-/off-road	On-road	Off-road	$\frac{1}{8}$, $\frac{1}{10}$ Off-road	$\frac{1}{4}$ scale
Part no.	94322	94735	94737	94738	94742
List price	\$49.95	\$99.95	\$99.95	\$99.95	\$69.95
Type	Standard	CL	High-speed /CL	High-torque/CL	High-speed
Torque (oz.-in.)	50	75	57	71	50
Speed (sec.)	0.20	0.20	0.15	0.21	0.11
Bearing	Single BB	Dual BB	Dual BB	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.54x0.79x1.42	1.54x0.79x1.38	1.54x0.79x1.38	1.54x0.79x1.38	1.54x0.79x1.38
Weight (oz.)	1.6	1.8	1.95	1.95	1.79
Gear type	Molded	Metal/molded	Metal/molded	Metal	Nylon
Operating voltage	6	4.8	4.8	4.8	6
Application	On-/off-road	On-/off-road	On-/off-road	On-/off-road	On-/off-road

more voltage equals better performance, so servos with specs based on an operating voltage of less than 6 volts will probably perform better than the numbers indicate if you supply them with more juice.

Speed: Also known as transit time, this is the length of time the servo takes to move the output horn 60 degrees. Faster servos feel more responsive to input from the radio because they execute commands more quickly. Speedy servos are nice, but unless you have the skill to fully exploit them, they aren't an absolute necessity.

Torque: A servo's torque is best described as its "strength," as measured in ounce-inches. One oz.-in. of torque is equal to the force generated by 1 ounce of pressure on a 1-inch lever. The more ounces, the stronger the servo.

Type: Servos come in several sizes: large-scale, standard, mini and micro. Large-scale servos are used in $\frac{1}{5}$ - and $\frac{1}{4}$ -scale vehicles, standards are used in most $\frac{1}{10}$ -scale cars, and mini-/microservos are most often used in $\frac{1}{12}$ scale and smaller cars. A "CL" designation indicates a coreless motor is used.

Part no.	HS-225BB	HS-235AG	HS-77BB	HS-303	HS-300BB	HS-525BB	HS-545BB	HS-605BB
List price	\$49.95	\$79.95	\$69.95	\$16.99	\$20.95	\$59.95	\$59.95	\$59.95
Type	Mighty mini	Alum. gear	Low-profile	Standard sport	Ball bearing	High-speed	High-torque	Super-torque
Torque (oz.-in.)	67	43	77	49	49	55	73	91
Speed (sec.)	0.11	0.09	0.14	0.16	0.16	0.12	0.17	0.13
Bearing	Top BB	Top BB	Top BB	None	Top BB	Top BB	Top BB	Dual BB
Dimensions (LxWxH, in.)	1.3x0.6x1.3	1.3x0.6x1.3	1.7x0.9x1	1.6x0.8x1.5	1.6x0.8x1.4	1.6x0.8x1.4	1.6x0.8x1.4	1.6x0.8x1.5
Weight (oz.)	0.95	1.1	1.3	1.75	1.75	1.6	1.6	1.73
Gear type	Resin	Aluminum	Resin	Resin	Resin	Resin	Resin	Metal
Operating voltage	6	6	6	6	6	6	6	6
Application	1/12, 1/10 on-road	1/12, 1/10 on-road	1/10 on/off-road	1/10 on/off-road	1/10 on/off-road	1/10 on/off-road	1/10 on/off-road	1/10, 1/8 on/off-road

Part no.	HS-605MG	HS-615MG
List price	\$70.95	\$75.95
Type	Metal gear	Ultra-torque
Torque (oz.-in.)	91	132
Speed (sec.)	0.13	0.18
Bearing	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.6x0.8x1.5	1.6x0.8x1.5
Weight (oz.)	2.12	2.12
Gear type	Metal	Metal
Operating voltage	6	6
Application	1/10, 1/8 on/off-road	1/10, 1/8 on/off-road

HITEC



CORELESS MOTORS & FET BOOSTERS

WHAT ARE THEY, AND DO YOU NEED THEM?

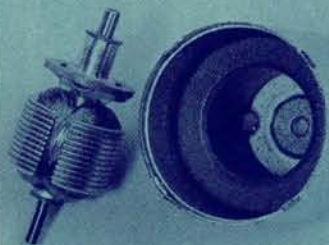
Regardless of size and strength, most servos operate with basically the same technology. Coreless and FET-boosted servos are the exceptions, and both types offer unique advantages. Let's look at coreless servos first.

A coreless servo gets its name from the motor it uses. To understand a coreless motor, we must first understand how a conventional "cored" motor operates. The cored motor in most servos is basically a tiny version of the motor that drives an electric R/C car; a steel armature is wrapped

Part no.	4735	3025	605	Z250	Z550	Z2750
List price	\$89.95	\$119.95	\$27.95	\$54.95	\$114.95	\$184.95
Type	Ultra-speed	Monster FET	Standard race	Premium race	Ultra-speed	Super race
Torque (oz.-in.)	139.1	49	49	62	90	61
Speed (sec.)	0.15	0.28	0.19	0.20	0.15	0.09
Bearing	Dual	Bushing	Bushing	Single BB	Dual	Dual BB
Dimensions (LxWxH, in.)	2.5x1.26x2.3	1.52x0.73x1.32	1.52x0.73x1.32	1.3x0.58x1.02	1.52x0.73x1.32	1.52x0.73x1.32
Weight (oz.)	4.75	1.47	1.47	1.47	1.72	2.0
Gear type	Plastic	Plastic	Plastic	Plastic	Plastic	Metal
Operating voltage	4.8	4.8	4.8	6	6	6
Application	1/12 on-road	1/4 scale	1/10 on/off-road	1/10 on/off-road	1/10, 1/8 on/off-road	1/10, 1/8 on/off-road

Part no.	Z3550	Z4750
List price	\$89.95	\$114.95
Type	Mini race	Ultra race
Torque (oz.-in.)	38	96
Speed (sec.)	0.11	0.12
Bearing	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.3x0.58x1.02	1.52x0.73x1.32
Weight (oz.)	1.61	1.72
Gear type	Plastic	Plastic
Operating voltage	6	6
Application	1/8 scale steering	1/12 on-road

JR



MOTOR COURTESY OF JR.

with wire and rotates between a pair of magnets. When voltage is applied to the armature, the alternate attraction and repulsion of the armature to and from the magnets causes it to spin.

A coreless motor is "inside out." The armature is a hollow

Part no.	1100	1101
List price	\$159.99	\$149.99
Type	FET high-torque	FET high-speed
Torque (oz.-in.)	97	62
Speed (sec.)	0.16	0.11
Bearing	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.5x1.6x0.8	1.5x1.6x0.8
Weight (oz.)	2.1	2.1
Gear type	Metal	Metal
Operating voltage	7.2	6
Application	4WD-steering for heavier EP models	Throttle for GP models



KO PROPO

Part no.	1104	1115
List price	\$149.99	\$139.99
Type	FET high-torque	FET high-speed
Torque (oz.-in.)	83	94
Speed (sec.)	0.14	0.05
Bearing	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.5x1.6x0.8	1.5x1.6x0.8
Weight (oz.)	2.1	1.8
Gear type	Metal	Plastic
Operating voltage	6	7.2
Application	4WD-steering for heavier GP models	4WD-steering for EPs, ultra-quick response



HOBBICO



Part no.	CS-11	CS-31	CS-61	CS-55	CS-67	CS-72
List price	\$49.99	\$34.99	\$16.99	\$19.99	\$29.99	\$47.99
Type	Micro	Mini	Standard	Standard deluxe	Standard	Large scale
Torque (oz.-in.)	30.25	23.38	42	43	43	130
Speed (sec.)	0.15	0.20	0.19	0.20	0.20	0.22
Bearing	None	None	Nylon	Dual Oilite BB	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.14x0.55x1.14	1.34x0.55x1.26	1.6x0.8x1.4	1.6x0.8x1.4	1.6x0.8x1.4	2.3x1.1x2
Weight (oz.)	0.61	0.95	1.56	1.61	1.61	3.60
Gear type	Nylon	Nylon	Nylon	Nylon	Nylon	Nylon
Operating voltage	4.8	4.8	4.8	4.8	4.8	4.8
Application	1/2 on-road	1/2 on-road	On/off-road	On/off-road	On/off-road	1/4-scale

MOTOR COURTESY OF JR.

tube of wrapped wire without any steel center (hence the term "coreless"). The magnets are fixed to the can but held within the armature, and the armature spins around them. The coreless armature is much lighter than the conventional type, and that allows it to speed up and slow down more quickly. Although more expensive, coreless-motor servos offer faster transit times, and they center more precisely than servos with "cored" motors.

You're probably familiar with FET technology from the world of ESCs; FETs (field-effect transistors) are solid-state switches that turn on and off very quickly to regulate the speed of the car's motor with less wasted energy and greater control. In this case, FETs are used to operate the servo's motor with the same benefits: the servo is more efficient, so more energy is turned into torque and speed, and servo action is smooth and precise. You've probably seen FET-boosted servos that require an extra wire to be hooked up to the ESC to receive a full 7.2 volts. Newer FET servos operate on 6 volts and don't require an additional wire. Just make sure your ESC or receiver pack is delivering enough juice!

So who needs these servos? Only the best drivers can fully exploit the capabilities of FET-boosted and coreless servos; you're at no disadvantage if you don't have them, and getting them won't make you a better driver. If anything, you might go slower if you don't have the steady hands to drive with lightning-quick servos. If you have the extra skills (and extra bucks), go for it, but if you don't, there are better places to spend your dough.

Part no.	CS-90 2BB	CS-60 2BB	CS-60 2BBMG	CS-80 2BB MG
List price	\$27.95	\$26.75	\$36.95	\$39.95
Type	Fast, low-profile	Standard	Durable standard	Super torque
Torque (oz.-in.)	31.75	56.38	65	129.86
Speed (sec.)	0.09	0.14	0.17	0.25
Bearing	Dual BB	Dual BB	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.75x1.13x.88	1.60x1.49x0.79	1.60x1.49x0.79	1.60x1.69x0.79
Weight (oz.)	1.13	1.58	1.94	2.01
Gear type	Nylon	Nylon	Metal gear	Metal gear
Operating voltage	NA	6	6	6
Application	1/10 on-road	1/10 on/off-road	1/10 on/off-road	1/8 scale

Part no.	CS-30BB	CS-600 2BBFET
List price	\$34.95	\$74.95
Type	Mini	Jumbo
Torque (oz.-in.)	44.44	333
Speed (sec.)	0.23	0.22
Bearing	Dual BB	Dual BB
Dimensions (LxWxH, in.)	1.22x1.21x0.63	2.48x2.22x1.27
Weight (oz.)	0.85	4.78
Gear type	Nylon	Nylon
Operating voltage	4.8	6
Application	1/12 scale	1/4 scale

The addresses of the companies featured in this Servo Guide are listed alphabetically in the Index of Manufacturers on page 201. ■

CIRRUS



SAVE THAT SERVO!

You have just installed a brand-new shiny black servo in your car—two, if you own a gas vehicle. Stand back now; don't they look good? But be careful—those servos are now susceptible to being damaged the second you turn the car on. How can this be? There are many ways to damage or destroy a servo; here's how not to!

Center it first

Before installing a servo horn or servo-saver, center the servo's output shaft. First plug the servo(s) into your receiver. Connect the receiver to a receiver pack or your ESC with a charger pack attached. Next, adjust your radio's trims to neutral, turn on the radio, and turn on the receiver and servos. You may now install your servo-saver or horn. If you skip this step, the servo may need a lot of trim from the radio to reach center, and that will limit your ability to adjust the car from the transmitter. That's the best-case scenario; at worst, when you switch the car on, the servo will try to center, only to strain against the travel limits of the linkage you've attached it to. This sort of abuse can strip a servo's internal gears or damage its motor.

Trim it out

Once the servo is centered and installed, you should adjust its throw so that it does not try to move any linkages beyond their travel range, or the damage described above might result. Better radios offer EPA, or end-point adjustments. This allows a servo's travel to be adjusted from center to full left, and center to full right. This will allow you to alter the servo's travel in each direction independently. If your radio has a "dual-rate" adjustment, total servo throw in both directions is changed. "Great; but what about my entry-level radio without those features?" you ask. No problem. Just move the linkage to a hole on the servo horn that's closer to the output shaft. It's not convenient, but it works. No matter how you do it, be sure to adjust your servos for bind-free operation.

Quit yankin' the tires

What's the first thing someone does when he picks up your car? First, he compresses the suspension; then he grasps the front wheels and swings them from side to side as your servo goes "fwee-fwee-fwee." Punch the next guy who does that! Swinging the servo horn around while unpowered causes the servo motor to generate electricity like an alternator. The power that the servo motor produces is fed back through the system and will send voltage spikes to your receiver and ESC. Your electronics were not designed to take these power spikes and might suffer damage.

Protect your investment with a servo-saver

When it comes to servo-damage prevention, this is The Biggie. There are three types of servo-savers:

- one-piece units that replace the servo horn—often found on pan cars and sedans.
- built-in bellcrank units that are part of the car—typically found in off-road buggies and trucks of all sizes.
- in-line springs (or sections of fuel tubing) that are installed along wire linkages—usually for the throttle and brake setup on gas machines.

All have the same function: they prevent the servo from binding if it tries to move past the



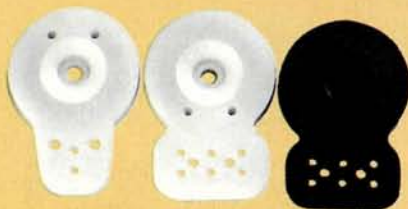
These Kimbrough units for 1/12-scale cars have low-tension springs. They are also smaller, since 1/12 cars don't require a lot of throw.

travel limit of the part it's connected to, and/or they absorb sudden linkage movement that might otherwise strip the servo gears. Servo-savers are most important for steering servos. If your car takes a good whack at the front wheels, the force of the blow goes right to the steering servo. A servo-saver will absorb that shock.

One-piece servo-savers aren't all alike, however. For instance, a "heavy-duty" servo-saver requires a lot of force to activate its spring; this type is designed for use with powerful servos. If installed on a mini servo, it won't protect those delicate gears. By the same token, a standard servo-saver might not have enough spring tension to transmit the torque of a powerful servo; instead of letting the servo steer the car's wheels, the servo-saver might just absorb the servo motion. Kimbrough is the leader in servo-savers and has the right unit for your application.

Many R/C cars have adjustable servo-savers built into the steering-bellcrank system—a major advantage because no additional servo-savers are required, and you can match the "saving" to your servo (and your ability to avoid hitting things, natch).

Some experienced racers feel that servo-savers reduce steering response and speed, so they choose not to install one or they lock up the built-in units. We don't recommend you follow suit; a properly adjusted servo-saver operates only if the servo is subjected to a severe load, and it does not affect normal driving. A broken steering servo is much less responsive than any servo-saver-equipped unit!



Kimbrough Servo-savers for 1/10 and 1/8 electric and gas vehicles. The larger savers offer more throw and use stronger springs to match stronger servos. The black model is for gas cars and features the strongest spring, so it can be used in large vehicles.

GET UP TO SPEED WITH ...

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In this installment of "Racer News," we talk to Mike Reedy of Reedy Modifieds. Reedy motors have won so many national and world championships, it would take at least a page to list them all.

Racers are no doubt familiar with Reedy motors, but not with what goes on behind the scenes at Reedy Modifieds—or inside the mind of veteran motor-builder Mike Reedy. Here's a chance to find out.

And speaking of world championships ... although Robert Itoh's name may not ring a bell with racers who are in the know, he is on record as the first American to win the prestigious Tamiya World Championships in Japan. That he won the Worlds is not the most

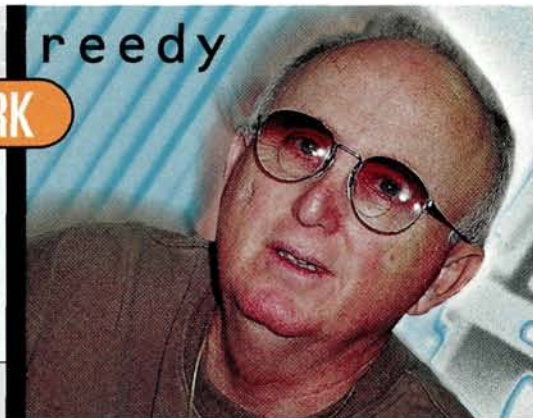
interesting part of this man's story, however; it's that he won the championship with a car he had built only the evening before the race. Simply amazing! Itoh was kind enough to share his exciting story with us so we can pass it along to you, and as an added bonus, he sent us his winning car! Now you can see—in full color—how Itoh set up his TA03R-S to win against a field of the world's top racers.

You'll also find some fine racing gear from Pro-Line, Hitec and Traxxas in this month's "Speed Shop," as well as a "Racer Tip" from Team Losi factory driver Matt Francis.

mike reedy

INNOVATOR AT WORK

We talked to Mike Reedy at the 12th Annual Reedy International Race of Champions (an event that's actually held on his behalf). Mike is a very interesting gentleman with an equally interesting past. He has worked with ROAR in one capacity or another for over 20 years. He has twice been elected ROAR president, has served as IFMAR vice president for 13 years and was Electric Chairman until 1994. In fact, Mike has spent a good portion of his life serving as a ROAR representative to IFMAR, stepping down only recently for personal reasons. Because of his long history of dedication to the hobby, he is well respected by all racers, regardless of team affiliation. Mike spoke to *R/C Car Action* at the recent Reedy Race; here is some of what he told us.



R/C Car Action: What career path were you on before you started Reedy Modifieds? Were you involved in any particular hobbies?

Mike Reedy: I was an electrical switch gear engineer, which means that I went from building equipment that used 13,000 volts and 600 amps to building electric motors that used 7.2 volts and 20 amps. My hobbies at the time were water skiing and 1/8-scale gas racing.

RCCA: When was Reedy Modifieds officially launched?

MR: August 1979, over breakfast with Team Associated owners Gene Husting and Roger Curtis, at the 1/8-scale gas world championships in Geneva, Switzerland. Prior to that, I was helping Team Associated to develop information about electric motors for their new 1/12-scale cars. We decided to take the gamble on what electric racing would develop into and offer a line of motors for this new class. As it turned out, it was a good decision.

RCCA: What do you like most about working in the R/C industry?

MR: Two things: the competition—both in busi-

ness and in racing—and the racers I have made friends with through the years, regardless of team affiliations.

RCCA: While we're on the subject of healthy competition, do you feel that manufacturers place too much emphasis on racing? Many people seem to think that the R/C industry is becoming another "money sport." Do you feel that Reedy Modifieds could continue to flourish without sponsoring drivers?

MR: Oh, boy; you're going to get me started on this one. I feel that too much emphasis is put on major racing events. I think major events are good promotional tools for helping the hobby grow, but the problem is that too many look at major races with a "win at any cost" attitude, instead of as a way to promote our hobby, with winning as the icing on the cake. Don't get me wrong; everyone should go to a race trying to win, that's what competition is all about. But we should not lose track of the fun and promotional aspects.

I feel that more emphasis should be placed on the manufacturers supporting or developing "grassroots" racing; you know, the Saturday-night club races. That is where the majority of

racers are, and they are the ones that make it all possible.

Yes, I'm afraid that R/C racing—on the top level—has become a money sport. It is no longer about fun or good, hard competition. I think that salaried drivers hurt the sport. Here's an example of what I mean. I was at a national racing event, and racer "A" won the first leg of the triple A-Mains. Racer "B" was leading in the second leg of the A-Main and actually slowed down to let racer A take the lead. Racer A then crashed, and racer B actually stopped on the track and waited for racer A to catch up and take the lead. Racer A ended up winning the national championship. After the race, I asked B why he did this. His answer was, "I'm not paid to win; I'm paid to help racer A win." That's not the attitude racers had before this money thing got so out of hand.

If I could have any wish in R/C racing, it would be to see the emphasis on money disappear from racing and to see the teams go to an event trying to win, but having fun with it. I go to races to try to win, but I want to win heads up on the track, not with games. If I lose, I go

(Continued from previous page.)

INNOVATOR AT WORK

home and work harder for the next one, but I try to have fun, win or lose.

I don't think that stopping our sponsorship of drivers would put me out of business, but I think that racing is a vital part of promoting not only business, but also the hobby overall. I do feel that the size of sponsored teams has gotten out of hand and that race organizers and manufacturers do not make use of what could be a great promotional tool to help R/C car racing grow.

RCCA: Wow! I obviously hit a nerve; I'm almost sorry I asked that last question! All right, Mike, do you feel that ROAR sanctioning places limits on motor, battery and chassis technology, or do you feel that ROAR encourages advances by amending the rule books?

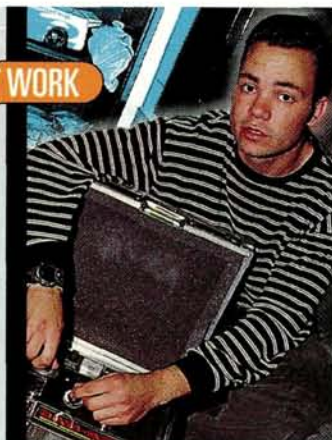
MR: ROAR does place limits on motors and batteries with its approval system. I feel these limits are beneficial to the hobby. They do not eliminate advancements in technology as much as they stabilize advancements and ease the potential problem of constantly outdated equipment. They also have a cost limit that helps stabilize two items that I think most racers are afraid of. Most racers are at ease with chassis and tires but are concerned about motors and batteries, as they feel they do not have as much personal control over them. With the restrictions and cost limits, these concerns are relieved.

RCCA: What are your favorite pastimes?

MR: R/C racing, reading a good book and eating good food. My friends tell me that I'm a workaholic, and I probably am. But I enjoy my work and the chances it gives me to travel and meet new people.

RCCA: What's your most memorable R/C experience?

MR: A lot of things stand out through the years, but my most memorable experience happened at the awards banquet at the



Mike Reedy's son, Darren Westman, demonstrates a motor magnet zapper he designed to improve performance by increasing the magnetic field inside the motor.

1988 IFMAR 1/12-scale world championships. As the vice president of IFMAR, I was asked to give out some of the trophies. The racers from all the teams stood up on their tables and chairs and gave me a standing ovation. I know this will sound corny, but it made me feel good and made me feel like a lot of the work had been worth it.

RCCA: I've lost track of how many national and world-championship events Reedy motors have won. What is the secret of your success?

MR: Love of racing and a lot of hard work. When someone from my team wins, I'm proud of his effort, so I work even harder to give him what he needs.

RCCA: What does the future hold for Reedy Modifieds?

MR: A lot of racing and a lot of fun! On the business end, the best thing I have going for the future is my son Darren. Like me, he hates to lose and wants to win. His presence is already a big help at the races and in the shop, and as I get older, he will be keeping up the pace in development and racing. He has a little more of that "killer" instinct than I do, which should make the future very interesting.

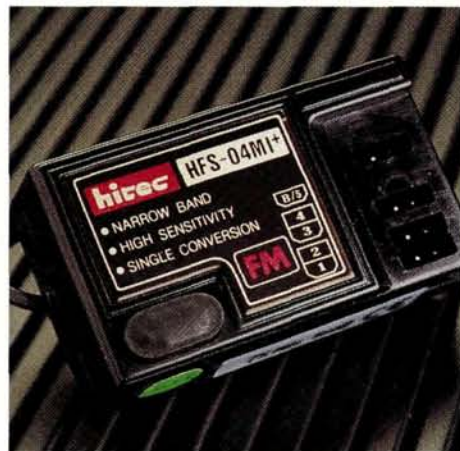
RCCA: Thanks for your time, Mike; we wish you continued success.

Speed Shop

New Hitec/RCD FM Receiver

The new HFS-04MI from Hitec is a super-narrowband, ultra-sensitive single-conversion receiver that is a perfect choice to use with all popular FM transmitters. For years, racers have searched for an affordable, dependable after-market FM receiver, but the most popular choices cost between \$70 and \$100, and it's about time racers had an affordable option.

According to Hitec, the new HFS-04MI receiver meets or exceeds the performance level of any surface-use FM receiver on the market today, and its best feature is its price! Because it provides virtually glitch-free performance, the HFS-04MI receiver is already preferred by many of the top off-road drivers on the West Coast. In fact, Cliff Lett of Team Associated helped test this receiver, and because of the great results, many Team Associated drivers now use it in their vehicles. The receiver retails for \$99.99, but after discounts, it should be available at hobby shops for around \$54.95.



HFS-04MI

27MHz, 3-channel FM receiver—part no. 24127.
75MHz, 3-channel FM receiver—24175.

Dimensions: 1.5x1.9x0.7 in.

Weight: 0.9 oz.

Compatibility: universal

Crystals: accepts original equipment from transmitter manufacturer

Traxxas Ball Diff for Nitro Rustler

Traxxas has at last released a ball differential for the Nitro Rustler (part no. 4420). Replace your Nitro Rustler's stock planetary gear diff with a high-performance ball diff; it will improve the Nitro Rustler's cornering ability dramatically by helping to eliminate spinouts. The new ball diff includes polished thrust-bearing rings and dual ball bearings for extra-smooth performance, and the unit can be adjusted without disassembly. The new ball diff will also fit the Nitro Sport and Nitro Stampede.





Pro-Line Off-Road Slick Tires

Also new from Pro-Line are the new M2 Low-Profile Off-Road Slick Tires for 2- and 4WD buggies. Yes, you heard right: slick tires for off-road buggies. Many of today's large indoor tracks feature glass-smooth surfaces that can play havoc with traction. At the 12th Annual Reedy Race of Champions, racers resorted to grinding down their off-road tires until only a slick surface was left. It turned out that slick tires were the hot ticket, and the cars had so much traction they were on the verge of traction-rolling the entire time. The best part, however, is that slick tires last a long time; I've heard reports from drivers who claim that one set can last an entire racing season! Well, Pro-Line has taken away all the fuss by offering racers low-profile slicks—no more grinding. The rear LP Slick tires (part no. 8187M2) fit Associated's B2 and B3 and Team Losi's Double-X 'CR' and Double-X4 stock rear wheels. The front LP Slick tires fit perfectly on the Losi Double-X4 front wheels, and they will also work on the Double-X 'CR' and Associated B2 and B3, if equipped with Pro-Line's Wide Cone-Dish 2.2-inch 2WD front wheels. Next time you're scrambling for traction on a slick off-road track, try a set of Pro-Line's LP Slick tires; they may be just what you need to get dialed. The Team Losi Double-X 'CR' "Kinwald" Edition shown here is decked out with a complete set of Pro-Line LP Slick tires and Wide Cone-Dish wheels.



Pro-Line Wide Ones Wheels

Pro-Line has developed and released a complete line of high-performance, 2.2-inch, off-road, wide cone-dish buggy wheels. According to Pro-Line, the wheels weigh less than the stock replacement wheels and were especially designed for Pro-Line tires. The rear wheels were made to stretch and lower the profile of 2.2-inch tires, thereby providing less sidewall flex and a larger contact patch. The front wheels were designed to deliver aggressive, stable traction for 2WD cars. At the '97-'98 IFMAR World Championships at the Ranch Pit Stop, all the Team Associated drivers reached for Pro-Line's rear Wide Ones wheels for their buggies.

2.2-inch Wide Cone-Dish wheels; \$5.95/pair.

Fronts

2WD, B2 and B3—part no. 2639 (natural color), 2639Y (yellow).

2WD, Double-X 'CR'—2640 and 2640Y.

4WD, Double-X4—2641 and 2641Y.

Rears

2WD, B2 and B3—part nos. 2634 and 2634Y.

Double-X 'CR' and Double-X4—2642 and 2642Y.

Traxxas 4-Tec Pro?

You're probably wondering, "What's a Traxxas vehicle doing in 'Racer News?'" Well, take a close look at this; you're looking at a hopped-up 4-Tec. Actually, this car has only a few of the hop-ups that Traxxas plans to release. Here's a quick list of the high-performance parts that will be available by the time you read this.

- > Graphite upper and lower chassis plates.
- > Graphite rear shock tower.
- > Custom-made aluminum big-bore shocks (short).
- > Pro dual ball-bearing ball differentials with shortened half shafts.
- > Front and rear sway-bars.
- > Ball bearings.



The car shown here is also equipped with super-narrow tires, a nasty motor and racing electronics, all of which are an indication of this car's intentions. Traxxas plans to release other cool hop-ups for it in the future, including—possibly—a 2-speed tranny. Keep your eye on the Traxxas website for new product releases. Of course, we'll keep you posted as well.

News Flash

Team Associated recognizes Hitec servos

Team Associated recently added a Hitec-compatible servo horn to its popular car kits. Until now, none of the major manufacturers included a horn that would fit Hitec servos, and racers were forced to use the standard heavy-duty servo horn included with the servo. Although these servo horns worked OK, it was frustrating that Hitec servos were not recognized as an option for these kits. If you own an Associated vehicle and are curious to know which Hitec servo is best suited to your vehicle, refer to the chart below.

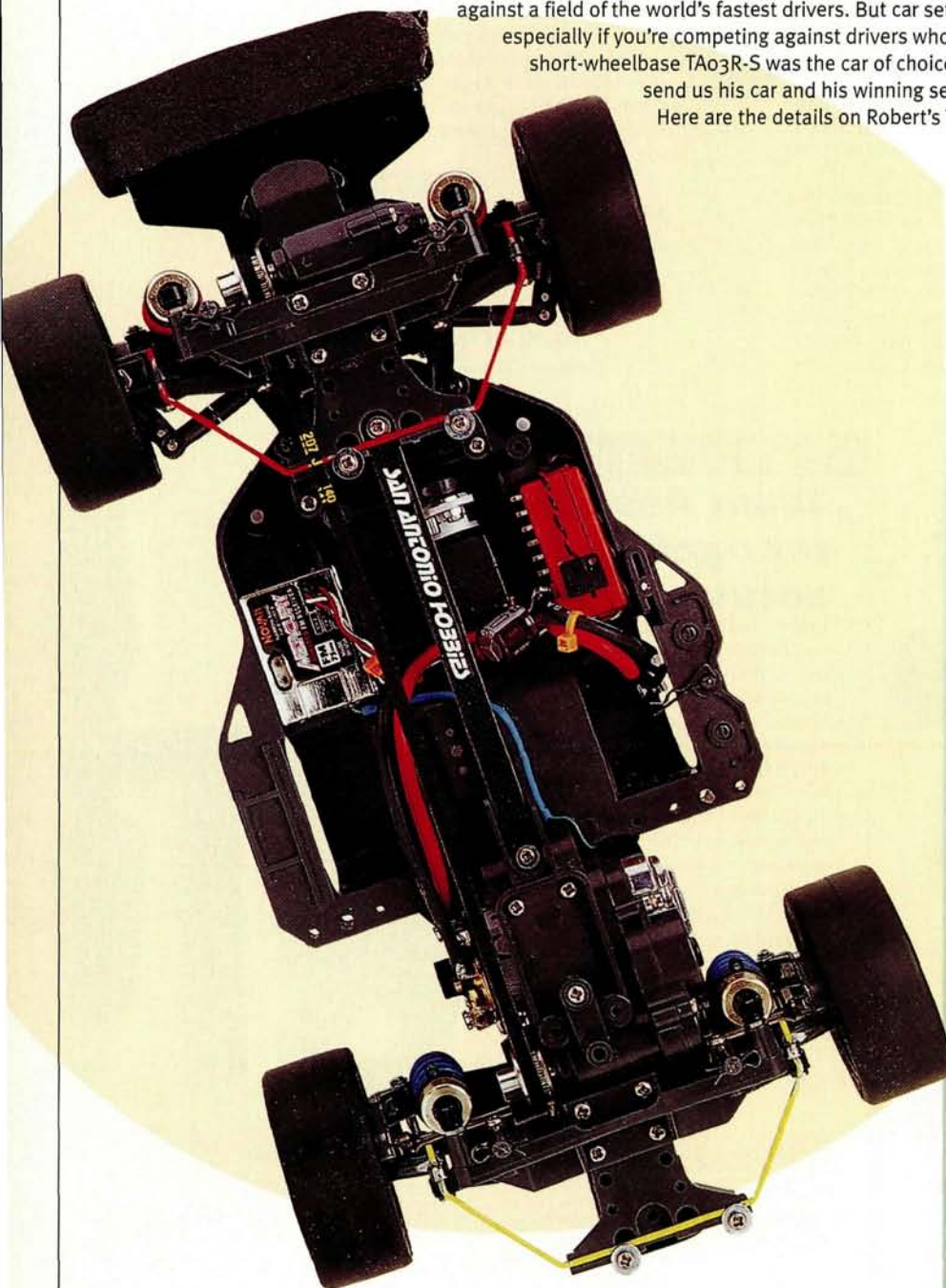


Vehicle	Hitec Servo	Specs (torque/speed)
RC10 B3	HS-525BB	55 oz.-in. @ .12 sec.
RC10 T3	HS-545BB or HS-605BB	73 oz.-in. @ .17 sec./92 oz.-in. @ .13 sec.
RC10 DS	HS-525BB or HS-225BB	65 oz.-in. @ .11 sec./55 oz.-in. @ .12 sec.
RC10L20	HS-225BB	55 oz.-in. @ .12 sec.
RC10L2	HS-235AG	43 oz.-in. @ .09 sec.
RC12LC	HS-235AG	43 oz.-in. @ .09 sec.

FROM THE WINNERS' CIRCLE

Robert Itoh's TCS Worlds-winning TA03R-S

It takes talent, dedication and a lot of hard work to win the Tamiya World Championships in Japan against a field of the world's fastest drivers. But car setup is also an extremely important element, especially if you're competing against drivers who are racing the same type of vehicle. Tamiya's short-wheelbase TA03R-S was the car of choice at this event. Robert was kind enough to send us his car and his winning setup so we can pass the information on to you. Here are the details on Robert's TCS World Championship-winning TA03R-S.



CHASSIS AND DRIVE TRAIN

- Chassis: stock bathtub
- Special chassis modifications: none
- Drive-train modifications (F/R): Manta Ray ball diffs; tungsten diff balls; hardened diff cups; universal drive shafts; 15-tooth aluminum pulleys; front torque splitter; aluminum countershafts; aramid fiber belt; and full ball bearings.
- Tires (F/R): Tamiya A-compound slicks with Black foam inserts (not the molded foam)
- Wheels (F/R): R390 GT 1 kit wheels, 2mm offset/4mm offset
- Body: Porsche 911 GT 1

FRONT SUSPENSION

- Shocks: optional Teflon-coated gold
- Piston: stock 2-hole
- Shock oil: Tamiya 200WT (15WT Associated equivalent)
- Travel limiters: four Tamiya black O-rings inside the shock bodies to limit down-travel
- Swaybar: red (soft)
- Ride height: 4mm
- Camber: 1 degree negative
- Caster: stock caster block
- Toe-in/out: 1-degree toe-out

REAR SUSPENSION

- Shocks: optional Teflon-coated gold
- Piston: stock 2-hole
- Shock oil: Tamiya 500WT (40WT Associated equivalent)
- Travel limiters: one Tamiya black O-ring inside the shock bodies to limit down-travel
- Swaybar: yellow (medium)
- Ride height: 5mm
- Camber: 1 degree negative
- Caster: stock block electronics
- ESC: Novak Cyclone
- Motor: Tamiya handout
- Batteries: Tamiya handout
- Radio: Futaba 3PJ
- Servo: Futaba S9102



RACER PROFILE ROBERT ITOH

VITAL SIGNS

Age: 27
Occupation: Systems R&D
Years racing: 3.5
Hometown: Mountain View, CA
First R/C car: Tamiya Castrol Primera
Favorite racing class: modified 4WD sedan
Favorite track: Tamiya's Kakegawa Circuit in Kakegawa, Japan

Favorite race: Tamiya World Championship
Sponsors: none
Other hobbies: mountain biking, tennis and computers
Major victories: '96 NORRCA Division 1 Road Course Championship ("my first big win"); Tamiya U.S. Nationals and World Championship (1st place in both).

We had the opportunity to speak to TCS world champ Robert Itoh shortly after he returned from competing at the Kyosho World Cup in Japan. Given the highly restricted nature of the TCS series, Robert's victory against an international field becomes even more impressive. Although Robert was still a little weary after his long journey, he was very happy to speak with us and, as expected, had some very interesting things to say.



R/C Car Action: It seems that you've had a very successful year, Robert; you dominated the Tamiya National Championships in the U.S., won the Tamiya World Championships in Japan and then won the Kyosho World Cup Nationals, which qualified you for the Kyosho World Championships in Japan, as well. What is the key to your success?

Robert Itoh: No special key or formula; I just try to relax and have fun.

RCCA: You chose to race the TA03R-S short-wheelbase chassis at the Worlds. Why didn't you race the TA03F-Pro?

RI: I wasn't able to get my TA03F completely dialed in by the end of controlled practice, so I asked Joe Houda, who was running an RS, if I could try out his car. I only had about 10 seconds with his car, but I immediately noticed a big difference in stability. For this reason, I chose to race the RS instead.

RCCA: You built the TA03R-S the evening before the race. What was that like?

RI: It wasn't too bad. After I made the decision to run the RS, I got the hot setup from Masayuki Miura [Tamiya factory racer], went to a nearby hobby shop to buy the car, ate dinner with the team, joked around with Dave Jun and Joe Houda for a while, and stayed up all night building the car. I tried painting the body in the bathroom, but the fumes were a bit overwhelming. At one point I was so sleepy, I realized I had forgotten to mask the windows before painting.

RCCA: I'm sure the racing action was intense, but which drivers—in your opinion—were the most aggressive, dominant, or passive?

RI: There were some aggressive drivers, but I don't think any were passive. I think everyone there was just going for it. This year, though, the

foreign teams dominated the Japanese. Combined, the U.S. and European teams won three of the four classes that they competed in.

RCCA: What was it like being up on the drivers' stand with the top Japanese and European racers and knowing that you were there representing the U.S.?

RI: It added a bit of pressure, but I think it helped me focus better.

RCCA: Was the pressure more intense at the World Championships or at the Nationals?

RI: Probably the Nationals because the trip to Japan was on the line. But at the Worlds, I was just glad to be there.

RCCA: How was the track?

RI: Everything about the track is first rate. It has an enormous roofed pit area, vending machines with hot and cold drinks, a roofed drivers' stand with a full R/C shop underneath, an announcers' booth, a room for the counting system, a starting light, air compressors and frequency scanners to help monitor frequency conflicts. The track also has a grass infield and raised berms for added realism. Once you get used to the track, it's extremely fun to race on. My favorite part is a high-speed, sweeping section that you can take at full throttle when it's set up right. Dave Jun aptly named it "Eau Rouge," after the sweeping Eau Rouge at the Spa-Francorchamps racetrack in Belgium.

RCCA: What was your overall experience at the Tamiya World Championships?

RI: Calling it my best racing experience would be an understatement, for several reasons: great racing conditions; great weather and awesome track; kind, hospitable Tamiya staff; we were treated very, very well; one of the most well-

organized, well-staffed, well-run events that I have ever attended; I got the chance to shop at Super R/C, which, in my opinion, is the best hobby shop in the world; and I got to fly home in business class, thanks to Tammy Hohwart and Dave Jun. I would like to take this opportunity to thank Tammy, Dave and Moto Suzuki for taking care of us at the event.

RCCA: Who were your toughest competitors there?

RI: The fastest teams were mainly from Europe, with the German team being the fastest of the group.

RCCA: What are your general feelings about the Kyosho World Cup?

RI: The event was run very professionally, and the Kyosho staff was great. I had a good time.

RCCA: Which world championship event did you find most difficult?

RI: The Kyosho World Cup was definitely the most difficult. I'm not a hardcore gas racer, and my knowledge of it is pretty limited.

RCCA: How did you prepare—mentally and physically—for both of these long journeys?

RI: I didn't make any mental or physical preparations.

RCCA: What advice can you pass along that would help the novice racer become faster?

RI: Watch and learn from the people who are consistently fast at your track. If you have questions about setup or driving, just ask. Most of the time, they'll tell you what you want to know. I think the rest is just learning from trial and error.

RCCA: Thanks for your time, Robert. See you at the races.

RACER TIP OF THE MONTH

Matt Francis
Team Losi factory driver

"Don't take R/C racing so seriously and don't burn yourself out by practicing too much. I know this sounds kind of odd, but I generally practice twice a week, which is more than sufficient for me. The most important aspect, though, is to try and have fun. Enjoyment is what this hobby is all about. I've found that I usually race more competitively when I'm more relaxed."



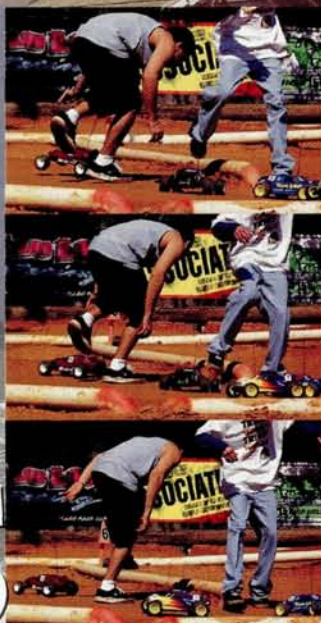
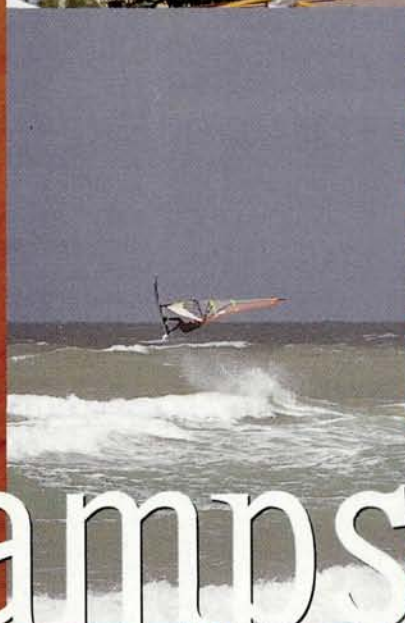
I WAS EXPECTING WET; I wasn't expecting surreal. However, the scene that greeted me as I arrived at the 1998 WinterChamps could be considered nothing less. Thanks to that infamous tropical phenomenon known as El Niño, the road into the Lake Park race venue was transformed into a dark, primeval river, utterly impassable on foot or by car. The park service had to bring in tractors and flatbed trailers to shuttle the racers to the track. At its deepest, the water was waist high and home to creatures well suited to the "Land of the Lost" setting—for example, alligators, as spotted by Bob Novak on one morning's trip downstream. Needless to say, I didn't see any racers dangling their fingers in the water; I guess no one wanted to be featured on "When Animals Attack, IV."

Once through the flooded area, racers were greeted by the sight of the West Coast R/C Club's well-groomed facility, which features plenty of bleacher space, a two-story drivers'



1998 Florida





Winterchamps

by Peter Vieira

The weather was sloppy—but Losi cleaned up!



stand and scenic surroundings complete with horse trails and an NBL BMX track. Although many racers had arrived early in the week to get valuable practice laps, rain prevented them from getting much meaningful track time. By the time qualifying began, track conditions had changed significantly; it appeared that the racers who could quickly adapt to the new track conditions would win the day.



Bob Novak dials in his Cyclone. Bob has been racing for over 20



years, and he competed in Two-Stock and Four-Mod at the Winterchamps.

Tekin's Kevin Orton confers with Masami Hirotsuka. Masami ran one of Tekin's new G-10s at the event.

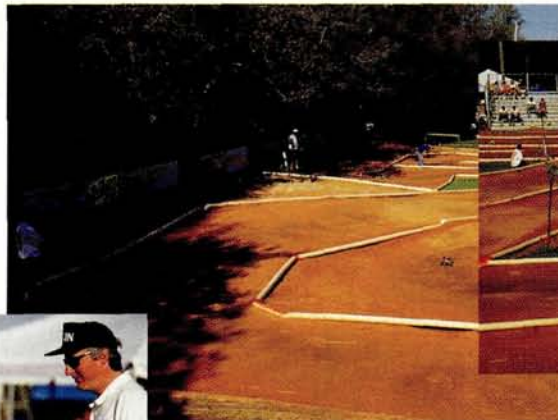


Above left: Alex Guerrero shows no tension on the drivers' stand. Above right: Schumacher's Teemu Leino talks with Team Orion motor man Oscar Jansen. Teemu took fifth place in Four-Mod.

QUALIFYING

Three heats of qualifying were used to determine the starting positions for the Mains. A single Main would determine the overall winner in 2WD stock, while winners of the modified classes would be determined by a triple A-main. Most racers saw their lap times improve with each qualifier, thanks to improving track conditions; in addition, the quals gave the racers vital track time, which foul weather had prevented for many of the competitors.

• **2WD Stock.** Team Associated dominated; all three top positions belonged to RC10B3s. Andy Smolnick was TQ after three rounds; Jared Scott was second; and local ace Spencer Sinsabaugh was



Above left: Jeremy Kopp and his Hitec-equipped Losi XX 'CR.' Above right: Peak prez Rick Hohwart closed the weekend with a second-place finish in 2WD Mod.



third qualifier. All the stock drivers posted their fastest times in the third round of qualifying as track conditions improved.

• **Truck Modified.** The third qualifier was the fastest for all the Truck Mod racers, but Team Losi's Alex Guerrero was the best of the bunch. Billy Easton was only 1 second behind the TQ pace with his RC10T3, and JR Mitch—also an Associated pilot—sat in the third position.

• **2WD Modified.** Like the Stock drivers, the Two-Mod racers posted faster laps with each successive heat—except for TQ Matt Francis, who actually posted the fastest lap with his second run. Gabe Boudreau qualified in second, and Team Associated's JR Mitch took third.

• **4WD Modified.** Chris Bing proved his Losi XX-4 was the fastest four-wheeler with a nearly perfect 10-lap run. Jimmy Jacobsen was 3 seconds off Gabe's best lap as the second qualifier, and Barry Baker put his Yokomo into the third qualifying position.

THE MAINS

• **Stock A-main.** Team Associated driver and class TQ Andy Smolnick got the holeshot, followed by second qualifier Jared Scott, who also piloted an RC10B3. The rest of the field did not get away as cleanly, and Robert Meyer took advantage of some back-field confusion to move from his eighth-place starting position to the number-three spot. By the third lap, Smolnick had dropped back to

I get by with a little help from my friends

Team Yokomo/Maxtec driver Barry Baker proved that qualifying first and winning first place are two very different things, as he decimated the competition with his Yokomo MX-4 in the Mains. I caught up with Barry after he had sewed up the 4WD Mod class with back-to-back A-main wins, and his teammate Greg Hodapp joined us.

R/C Car Action: Barry, I heard the announcer say you were sponsored by "Greg's Setup Shop." What's the scoop?

Barry Baker: Greg and I came in about a week early. Everybody says we got a ton of practice on the track, but the track was totally different than it is right now, during the races. It was green; it was slimy. Everybody says, "Oh, you got your car set up." Well, OK; it was good for that track, but when I brought my car out on Friday for qualifying, it wasn't very good. Greg had a brainstorm the night before and said, "I'm going to try this," so I said, "OK; you try that and I'll try what I've got. Let's see what works." My car was in agony and his car looked beautiful on the track. So we set my car up in exactly the same way.

RCCA: How far off was Barry's setup from yours?

Greg Hodapp: His setup was basically what we had the week before when we had the cars feeling really thick. The Yokomos have some flex because they use a double-decker chassis, so we stayed up one night and decided the cars needed real light oil but with small-hole pistons so they can't slap the ground as easily. I'd say the setup was a lot different from what we had before.

BB: I'd say it was a 180-degree swap.

RCCA: How do you like the new Maxtec motors?

BB: They're the best! The new Shockwave is just incredible; I mean, to win a race without our motor man here says a lot.

RCCA: Thanks guys. Congratulations on your winning efforts, and we'll see you at the Cactus Classic!

Winning Widgets Here are the top choices of the Mod-class factory hotshoes, as determined by the number of A-main drivers using the brand shown:

- **Top Motor:** Trinity. 33% were Trinity powered, and Trinity motors put Matt and Mark Francis onto the podium in Two-Wheel and Truck Mod (Maxtec edged 'em out in four-wheel).
- **Top Battery:** Trinity. 33% used Trinity cells—including Matt and Mark, while Maxtec again prevented a Trinity trifecta.
- **Top Speed Control:** Novak. 50% ran with Novak, but LRP won two of the three Mod classes, and 46% used LRP controllers.
- **Top Radio:** Airtronics. 57% used Airtronics radio gear, and the 2WD Mod and Truck Mod classes were won with Airtronics. Barry Baker used a KO Propo to win four-wheel.
- **Top Tires:** Pro-Line. 83% chose Pro-Line tires. When a tire works, racers flock to it.

What about Stock Class? The motors were handouts from Phantom, and Reedy batteries were the top pick; LRP equipped half the field with ESCs and took the top four spots; Airtronics was the favorite radio (but Jason Conley used a JR to win); and Pro-Line tires were on every car in the A-main.

MIA Brian Kinwald and Mark Pavidis

Two notable drivers disappeared from the Winterchamps scene before qualifying was finished: Mark Pavidis (Team Associated) and Brian Kinwald (Team Trinity/Losi). Before his third qualifier, Mark had to jet back to California due to a family emergency, but he managed to secure the eighth position in the A-main nonetheless. With only a single qualifier in the can, Brian was taken out by a stomach virus and spent the weekend enjoying the hospitality of a Holiday Inn. There were a few "What if Brian and Mark were here" comments during the weekend, but in my mind, it's simple (editorial-comment alert): if you don't show up to race, you aren't in the race—end of story.

Fast freelancer

It's always nice when a privateer steps into the A-main limelight with a big national victory. Ohio native Jason Conley did just that with his 2WD Stock win. With a bit of luck and a lot of skill, but no factory support, Jason put his RC10B3 into the winners' circle. I grabbed some shade with Jason under his pit tent and got a few comments.

R/C Car Action: Congratulations on your big win! What was going through your mind when you saw Jared's car on its lid just 10 feet from the finish?

Jason Conley: I won't deny he kind of handed it to me, but I think it would have been a different race anyway, had it gone another lap. I don't want to take anything away from Jared, but taking that last jump the way he did was his decision. Maybe he's been in that position more than I have and felt comfortable hot-doggin' it, but in a national event, I wouldn't take any chances.

RCCA: Quite true. Let's get back to you; you are a completely unsponsored stock racer; is that correct?

JC: That's correct.

RCCA: Why did you choose the Stock class for national-level competition?

JC: Just to get my name out. That was my biggest

goal coming out here: to make the A-main in Stock. I was lucky enough to pull it off. This is my first A-main at a national and my first win.

RCCA: How different is stock racing from mod for you?

JC: The competition is different. At the club level, the stock competition is a little bit less than in the mod class. In the region I'm running in, the competition is pretty tight, and you really can't take getting into the A-main for granted.

RCCA: Is the Winterchamps track good for you as a stock racer, or doesn't it make a difference to you?

JC: It's a good track; there are quite a few places to pass. The times are really split more than I thought they would be. It's a good stock track. It's probably the largest margin of time that I've

seen in a while in a national stock A-main. Maybe that's the level of competition that was in Stock or just the way the track ran.

RCCA: Any interest in you from the manufacturers yet?

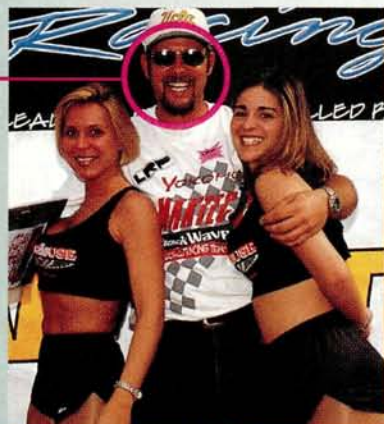
JC: Yeah, I've spoken with a few companies. We'll see what happens!

RCCA: Good luck!

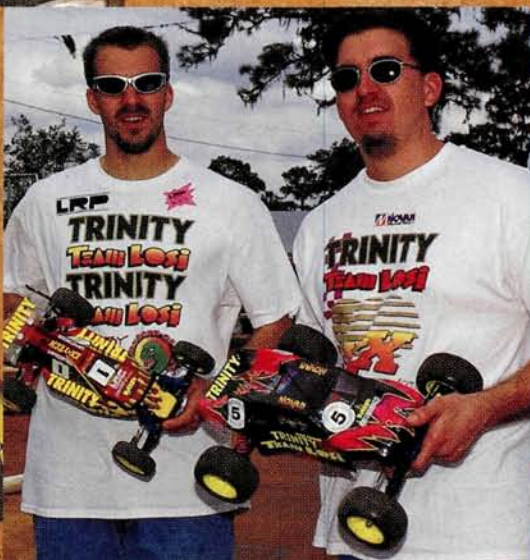
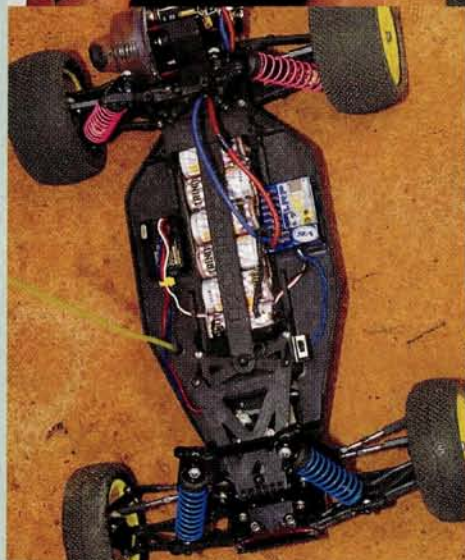
Since I spoke with Jason, he has picked up LRP for speed controls and will be using Orion motors and batteries. He doesn't yet have a car deal, however, so if you car manufacturers are reading this



Jason Conley's Stock-winning RC10B3.



Far left: 4WD Modified winner Barry Baker gives the Charmin treatment to the "award presentation technicians." Left: the Bakermobile; Barry's MX-4 was unstoppable in the Mains. Bottom left: Matt Francis' winning Losi XX 'CR'. Bottom center: The brothers Francis pose with their winning Losi machines. Bottom right: Mark Francis' XXT 'CR'—the WinterChamps' top truck.



1998 FLORIDA WINTERCHAMPS

sixth, while Scott and Meyer had moved into first and second with local favorite Spencer Sinsabaugh in tow. However, privateer Jason Conley lurked in fourth and took advantage of a mistake on Sinsabaugh's part to move his B3 into third. Meanwhile, TQ Jason Smolnick patiently worked his way back through the field and found himself in fourth place by the fifth lap.

Jared Scott continued to lead the race

as the positions changed behind him; Rob Meyer was overtaken by Jason Conley for second place, and Andy Smolnick bided his time in third after advancing on Robert Meyer, who drifted back to sixth.

It looked as if that would be the finishing order as the clock ticked down to the final seconds. Then Jared made a fatal error by skying his buggy over the final tabletop and landing it on its roof just 10 feet from the finish line; this allowed Jason Conley to cruise in for the win. Jared's car was marshalled in time to claim second, while TQ Andy Smolnick

settled for third. It was later rumored that Jared simply wanted to add a little Jeremy McGrath flavor to the finish; Jeremy doesn't usually blow the win by dumping his bike after a nac-nac, however!

TRUCK MODIFIED

• **Round 1.** TQ Alex Guerrero made his pole position stick for the first five laps, holding off JR Mitch and Mark Francis who kept close behind in the second and third spots. Less than half a second separated the top three as they poured it on lap after lap. JR eventually got past Alex

2WD Stock

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires	Traction additive	Gear ratio
1	4	Jason Conley	Associated	Handout	GM	LRP	JR	Associated	Pro-Line	N/A	81/25
2	2	Jared Scott	Associated	Handout	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	84/24
3	1	Andy Smolnick	Associated	Handout	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	84/24
4	5	Jason Corl	Associated	Handout	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	84/24
5	3	S. Sinsabaugh	Associated	Handout	Reedy	Novak	Airtronics	Associated	Pro-Line	N/A	81/25
6	6	Todd Lewis	Losi	Handout	Orion	Novak	Airtronics	Losi	Losi/Pro-Line	Trinity	84/24
7	7	Ryan Burroughs	Associated	Handout	BRT	LRP	BPS	Associated	Pro-Line	Associated	83/24
8	9	Rob Michael	Losi	Handout	Maxtec	Novak	Airtronics	Losi	Pro-Line	Trinity	84/25
9	10	Ryan Eckert	Losi	Handout	Mad Dog	Tekin	Airtronics	Losi	Pro-Line	N/A	84/27
10	8	Robert Meyer	Associated	Handout	Powerline	Tekin	Airtronics	Associated	Pro-Line	N/A	81/23

2WD Modified

1	1	Matt Francis	Losi	Trinity	Trinity	LRP	Airtronics	Losi	Pro-Line	Trinity	84/21
2	4	Rick Hohwart	Losi	Peak	Orion	Novak	Futaba	Losi	Pro-Line	N/A	84/21
3	5	Mark Francis	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Pro-Line	Trinity	86/19
4	3	JR Mitch	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	81/20
5	6	Jukka Steenari	Losi	Orion	Orion	Novak	Airtronics	Losi	Pro-Line	N/A	82/19
6	7	Scott Brown	Losi	Trinity	Trinity	Novak	JR	Losi	Losi/Pro-Line	Trinity	84/19
7	2	Gabe Boudreau	Losi	Trinity	Trinity	Novak	Airtronics	Losi	NA	NA	NA
8	8	Greg Hodapp	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	Pro-Line	Trinity	84/22
9	10	Chuck Berg	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	81/20
10	9	Jimmy Jacobsen	Associated	Reedy	Reedy	LRP	KO Propo	Associated	Pro-Line	Associated	81/22

NITRO'S HOTTEST SHOWROOM,



When you want to browse around gas racing's hottest showroom, start up your internet browser. Log onto the Team Serpent Network web site and find out how the Power-Start starting box effortlessly fires up a gas car or truck. Learn why ROAR champs and the Worlds T.Q. choose Mega engines. See which Impact-2 features make it such a 1/10-scale racing force. Or discover why the Vector is simply the most advanced R/C car ever made. If you're into gas, get into TSN - Because the keys to unlock nitro's hottest showroom are at your fingertips.



with a minute and a half to go, but things got ugly as the pair went into the "bow tie." JR's T3 got sideways after clearing the doubles that mark the entrance to the section and scrubbed off a lot of speed in the process. Alex's XXT 'CR' came over the doubles cleanly, losing almost no speed. With virtually no time to brake, Alex's truck clobbered JR's machine. It wasn't pretty, but (to this spectator) it didn't look intentional; it just looked like racin'.

Mark Francis took advantage of the collision to assume the number-one spot with Alex and JR in hot pursuit. Bad luck

struck Alex's lime green Double-X 'CR,' as it caught a pipe and rolled over in the bow tie during the final seconds of the race, putting him behind third-place Losi driver Scott Brown. Mark rolled in with the win, followed by JR and Scott. Although he crossed the line in fourth, Alex was later assessed a 10-second penalty for rough driving, and that relegated him to eighth place. Although many didn't feel the penalty was necessary, Alex took it in stride. "We'll take it," he said; "It looked pretty ugly."

• **Round 2.** Alex Guerrero used his pole position start to grab first place, but put his XXT 'CR' onto its lid before the first lap was into the record books. Billy Easton piloted his RC10T3 into the number-one spot, and Alex's machine was righted in time to hold second place. Meanwhile, Mark Francis, the winner of the first round, moved from his fifth-place qualifying position into third and challenged Guerrero for second. Mark made quick work of his Losi teammate and took second after three laps. Alex found trouble in traffic, and a bit of bad luck sent him to seventh.

4WD Modified

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires	Traction additive	Gear ratio
1	3	Barry Baker	Yokomo	Maxtec	Maxtec	LRP	Ko Propo	Yokomo	Pro-Line	Associated	84/18
2	1	Chris Bing	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Pro-Line	Trinity	84/19
3	6	Scott Brown	Losi	Trinity	Trinity	Novak	JR	Losi	Pro-Line	Trinity	82/20
4	5	Jukka Steenari	Losi	Orion	Orion	Novak	Sanwa	Losi	Pro-Line	N/A	84/19
5	10	Teemu Leino	Schumacher	Orion	Orion	LRP	Sanwa	Schumacher	Pro-Line	Trinity	89/16
6	7	Rick Hohwart	Losi	Peak	Orion	Novak	Futaba	Losi	Losi/Pro-Line	N/A	87/18
7	9	Masami Hirosaka	Yokomo	Reedy	Yokomo	Tekin	KO Propo	Yokomo	Pro-Line	Associated	NA
8	2	Jimmy Jacobsen	Yokomo	Reedy	Reedy	LRP	KO Propo	Yokomo	Pro-Line	Associated	84/18
9	8	Matt Francis	Losi	Trinity	Trinity	LRP	Airtronics	Stock	Pro-Line	Trinity	84/19
10	4	Sohrab Tavakoli	Losi	Maxtec	Maxtec	Novak	NA	Losi	Pro-Line	NA	NA

Truck Modified

1	5	Mark Francis	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Pro-Line	Trinity	86/19
2	3	JR Mitch	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	81/17
3	2	Billy Easton	Associated	Reedy	Reedy	LRP	Futaba	Associated	Pro-Line	Associated	87/18
4	6	Scott Brown	Losi	Trinity	Trinity	Novak	JR	Losi	Losi/Pro-Line	Trinity	84/19
5	10	Matt Francis	Losi	Trinity	Trinity	LRP	Airtronics	Losi	Losi/Pro-Line	Trinity	88/19
6	4	Brad Reelfs	Associated	Peak	Orion	Novak	Airtronics	Associated	Pro-Line	Associated	87/17
7	7	Mike Walker	Associated	Reedy	Reedy	LRP	NA	Associated	Pro-Line	Associated	87/16
8	1	Alex Guerrero	Losi	Peak	Orion	Novak	Airtronics	Losi	Pro-Line	NA	NA
9	9	Barry Baker	Associated	Maxtec	Maxtec	LRP	KO Propo	Associated	Pro-Line	Associated	87/19
10	8	Mark Pavidis	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	None	NA

NA = Not available, N/A = Not applicable

AND YOU'VE GOT THE KEYS.



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Serpent
EXCITEMENT IN THE FAST LANE

Mark was now in the hunt for Billy Easton and steadily closed the gap while brother Matt kept close by in third. In a nail-biting performance with less than a minute to go, Mark made an inside pass on Easton to take over the lead. Billy kept the heat on in second but could not regain position before time was up. Matt Francis cruised into a third-place finish, and Mark sewed up the Winterchamps' Truck Mod title by finishing first in two of the three mains.

• **Final round.** You might think this race would be anticlimactic, as Mark Francis had already sewed up the overall win and was kicking back in the Losi tent; but don't tell that to the guys battling for the second- and third-place podium spots!

Alex Guerrero once again held on to first for the initial laps, leading the T3s of JR Mitch and Billy Easton. Bad luck struck Alex on lap four, however, when his XXT 'CR' nosed over the front-straight table-top. This allowed JR Mitch to take over the lead while Billy Easton snatched second and Alex returned to the action in third. Only moments later, Alex rolled his truck and lost another position, putting

Scott Brown into third.

Guerrero looked as if he could have moved back up in the field—hey, he was TQ after all—but broke two laps later. The top three held their positions to the finish: JR Mitch took the win, Billy Easton picked up second, and Scott Brown snagged third.

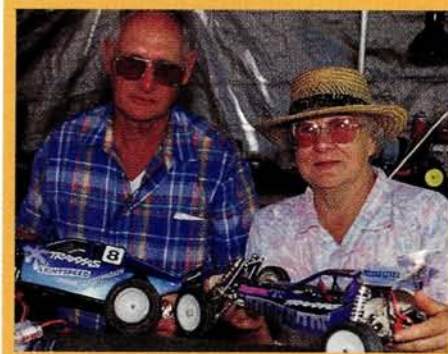
After the points for all three Mains had been tallied, Mark Francis walked away with first-place bragging rights, JR Mitch took second, and Billy Easton placed third.

2WD MODIFIED

• **Round 1.** The first two-wheel Main was The Matt Francis Show. The class TQ used a big dose of Trinity power to take the holeshot and then led every lap all the way to the finish tone.

JR Mitch started in third, found himself in sixth after the first turn, then quickly battled back to secure second by the fourth lap; JR hung close to Matt's bumper for the remainder of the race. Gabe Boudreau—the number-two qualifier—broke on lap five. Fifth-place qualifier Mark Francis moved into third at the start and emulated his brother by holding his position until the finish.

• **Round 2.** The Matt Francis Show was in



McMillan and Wife

Well, if it isn't Don and Jane McMillan! With help from Traxxas, Litespeed, MIP and Kimbrough, this dynamic duo races all over the U.S. of A. to promote our hobby/sport. From the Stock Nats in Washington to the Florida Winterchamps, this team really puts in the miles. Both Don and Jane raced their Traxxas machines in Stock and Mod classes and even raffled off a Traxxas Rustler to a lucky spectator.

reruns, as a clean start found the TQ and winner of the first Main again in the top spot. Fellow Losi driver Gabe Boudreau hung just 1 second behind, while Rick Hohwart moved his own Losi buggy from the fourth-place qualifying position into third. Scott Brown kept the pressure on Rick from fourth place, and that was basically the race: the top four did not change position from the "Go" tone to the final buzzer. With back-to-back A-Main wins, Matt Francis was the 2WD Mod champ.

• **Final round.** It was Matt Francis' turn to take a break, since he had already earned the 2WD top honors with his back-to-back A-main wins. In the third Main, Rick Hohwart shot out to an early lead with Scott Brown and Jukka Steenari close behind.

Scott Brown found some bad luck and got bumped from second back to eighth, allowing Jukka and JR to move up to the second and third spots. Meanwhile, Mark Francis was proving his buggy-handling abilities as he moved steadily through the field. Although he was in eighth after the start, Mark had his sights on third at the halfway point. JR made a valiant effort to get past Jukka for second place, but he flipped his car. Mark seized the opportunity and put his XX 'CR' into third as JR recovered in time to hold on to fourth. Rick Hohwart made an unchallenged run to the finish, Jukka took second, and Mark Francis rolled in third.

The final standings after three Mains found Matt Francis in first with his two A-main wins, Rick Hohwart in second, and Mark Francis in third.

4WD MODIFIED

• **Round 1.** He may have been the third qualifier, but Barry Baker was definitely the number-one driver in this Main. Barry shot

(Continued on page 196)



Losi "Mr. T" tires

The Losi guys had a new tire at the Winterchamps, and it was unofficially dubbed the "Mr. T" for its T-shaped center lugs. The word from Team Losi is that the "Mr. T" design should be a hot setup for hard-packed to blue-groove surfaces.

Here's the concept: the outside knobs are positioned to generate greater side bite, while the inside knobs are optimized to produce forward traction. According to Gil Losi Jr., this setup reflects what happens in an "open diff" car as it corners; the diff sends power to the inside wheel, which is running on its inside surface because of the vehicle's lean angle. Meanwhile, the outside wheel is resisting the forces trying to spin the car out and is transitioning to its outer tread surface as the truck leans. No word yet on the tires' effectiveness, as Losi didn't have time to test them on the Winterchamps track. (Late-breaking news: the "Mr. T" has been officially dubbed the "T-2000.")

Schumacher Fireblade America

Robin Schumacher pulled the wraps off this prototype Fireblade with more traditional stand-up shocks. Dubbed the "Fireblade



America," the new suspension configuration should help the car to cope better with bumpy American-style club tracks—hence the name.



Pro-Line Velocity wheels

Spotted in the Associated tent, these wheels feature a very shallow dish with a deep, small-diameter socket for the mounting nut. Designed to minimize flexing, reinforcing ribs on the reverse side stiffen the rim so the tire can do its job. The wheels are available to fit Losi and Associated trucks.



GM XS speed control

The new XS looks a lot like the ASP, and it features all of that speedo's features—except for the actual Active Steering and Power feature! That makes the XS legal for ROAR competition, so racers can exploit the unit's other features, such as adjustable frequency, traction control and min./max. brake.

The addresses of the companies featured here are listed alphabetically in the Index of Manufacturers on page 201.

HOW TO Understand Battery Labels and Dyno Sheets

Know Your Numbers by Matt Manspeaker

Any racer worth his trophy collection will run matched packs in his car. To those in the know, the cryptic label on each cell paints a picture of the pack's performance; to the uninitiated, they're just numbers, and the number that seems to make the least sense is the big one on the price tag. Why do these batteries cost so much dough?

By the same token, the fast guys will also pay extra for the slip of paper that comes with their motor, better known as a dyno sheet. Like the battery labels, the dyno sheet represents a snapshot of the motor's performance. But what is the code? What does it mean?

It's not so difficult to understand. Number by number, it all adds up

WHAT ARE MATCHED BATTERIES?

Think of the cells in a pack as the cylinders in a full-size car's engine; all the pistons have to work together to power the car. The engine will still run if the timing of the valves is a little off, or even if one piston isn't firing at all; but when everything is adjusted so that all the components work in harmony, the engine sings. In a typical unmatched battery pack, each cell is slightly different: one can hold a little more energy; another might have a bit more punch. The cells' varied performances average out, and that's perfectly fine for most of us. However, dedicated racers want all those pistons firing; for maximum performance, they want all the cells to be as closely matched as they can be. The folks who match batteries do just that; they test individual cells and sort them by their performance, putting the best performing, most similar cells together. The labels on the cells show the data generated by the tests. Here's what it all means:

RUN TIME

the number of seconds that the cell will provide current until it reaches the cutoff voltage. Most matchers stop counting the seconds when the cell is down to .9 volt. For a true indication of cell performance, this number must be considered along with the discharge rate. More run time is not always necessary, but it is always more expensive.

DISCHARGE RATE

the rate (in amps) at which the cell was discharged when it was matched. Twenty amps is the most common, but 25A and 30A settings are also used.

CHARGE RATE

the rate at which the cell was charged when it was matched. Contrary to popular belief, it is not necessary to charge at this rate during subsequent charges; it is just information the matcher provides.

INTERNAL RESISTANCE (IR)

this number reflects the ability of the cell to allow current to flow through it and is probably the best indicator of overall cell condition. It is a relative number for comparing cells and is not an actual resistance value in ohms. Lower numbers are preferable. As with average voltage, IR is affected by the discharge rate. Generally speaking, IR numbers will be higher for cells discharged at a higher rate. For example, a cell that has an IR of 25 that was matched at 30 amps is more desirable than a cell with an IR of 25 that was matched at 20 amps. Charge rate can also affect the IR numbers on the labels.

AVERAGE VOLTAGE

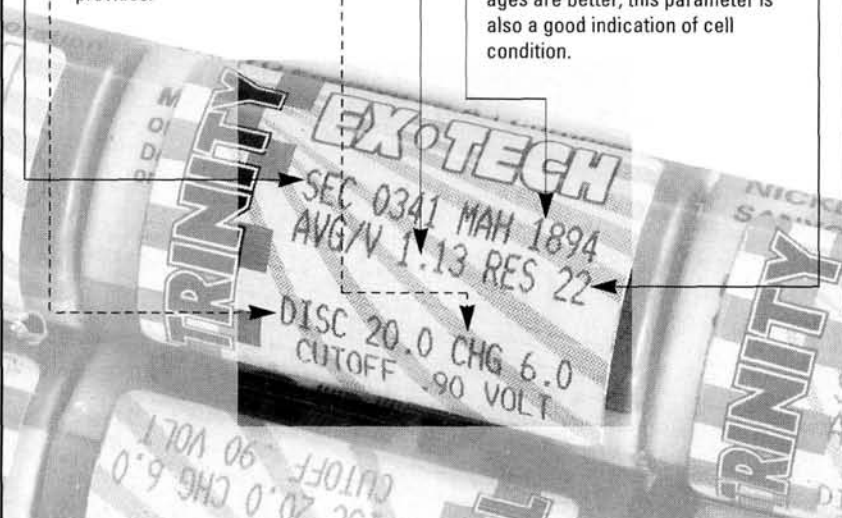
the average DC voltage of the cell during the test period; higher is better. It is generally accepted that for every 5 additional amps of discharge current, voltage will drop by .02 volt (for example, a 1.15V cell at 20 amps will measure 1.13 volts at 25 amps). The actual numbers will vary with the type of cell in question, but this is a good rule of thumb.

CHARGE TIME

the length of time (in seconds) that it took the cell to peak and then re-peak at the specified charge rate. This is not listed on all labels; only certain matchers choose to include this information. Ideally, it is best if all of the cells take about the same time to charge.

PEAK CHARGE VOLTAGE

(not shown) the highest voltage reached during the re-peak process. Matchers generally record the re-peak voltage, not the first peak voltage. Lower voltages are better; this parameter is also a good indication of cell condition.



DECIPHERING DYNO SHEETS

The tool used to measure the performance of the motors used in our hobby is the dynamometer. Commonly known as the "dyno," it tests a motor under a variety of load conditions and produces data that reflect the capabilities of the motor for comparison with others. However, dynos are not necessarily the last word on motor performance. That determination is made on the racetrack. Plenty of motors look less than spectacular on the dyno, yet are ballistic on the racetrack. It's a good thing we don't race dynos! However, if a dyno user knows which characteristics to look for in a motor, they can be reasonably assured that once the desired results are obtained on the dyno, the motor will perform similarly on the track.

This is what the output sheet of a Competition Electronics* Turbodyno indicates when torque-step-testing a motor (the sheet from a Trinity Midnight 2 Pro is shown).

RPM

the rpm that the motor attained during each step of the load process. The rpm reading is a useful tool for selecting gearing. If a racer has a gear and motor combination that he knows works great, he can test the motor on the dyno and have a benchmark to compare all others with. That way, if the dyno results for a new motor look better than the benchmark, the user can then compare rpm numbers and decide whether to change the car's gearing.

WATT (WATTS)

the power output of the motor. For comparison, 746 watts equal 1hp. As you might expect, more is better when it comes to power.

EF (EFFICIENCY)

is the relationship of the motor's mechanical output power to the electrical input power: the higher the number, the more efficiently the motor operates. Efficiency is a critical parameter; as the efficiency of a motor increases, the amperage required to produce the same horsepower decreases. Efficiency is the best gauge for comparing similar motors.

CONSTANT VOLT (CONSTANT VOLTAGE)

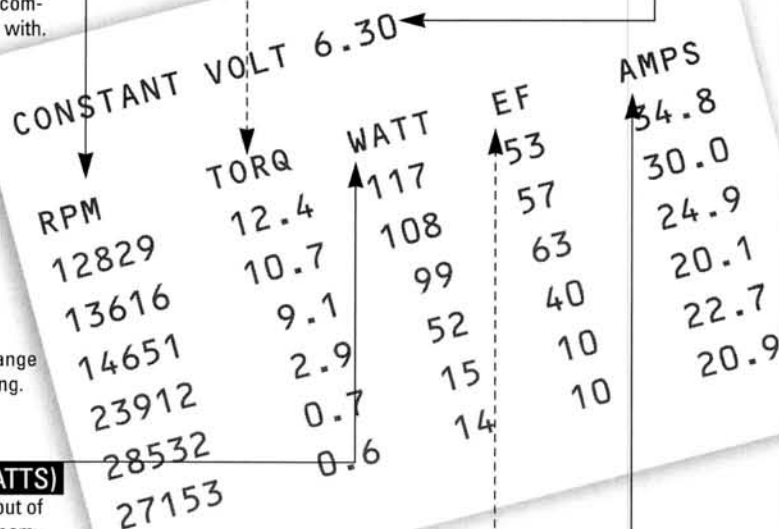
this is the voltage at which the motor was tested. Only motors tested at the same voltage can be directly compared.

TORQ (TORQUE)

the load placed on the motor for that particular step of the test.

AMPS

the amount of current that the motor required to produce the readings listed. Torque and rpm must be considered together when gauging a motor's performance. For example, a motor that has lots of rpm, but is under a lighter torque load is not as powerful as a motor that gives the same rpm under a heavier load.



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understanding the labels, you'll know what you're getting before you lay down your hard-earned cash.

Good luck and have fun!

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.

Tuning and Modifying the

Kyosho Mantis EP

by Peter Vieira



IT'S EXACTLY one year since I reviewed Kyosho's* Shelby Cobra Mantis EP. I found the entry-level chassis suitably rugged and a forgiving handler, but I really saw the car as a blank canvas. Stripped of its mechanical speed control, the chassis' clever space-frame design looked very businesslike, and the low-slung 3-gear transmission appeared ready for some real horsepower. The Mantis was ripe for hop-ups, and I was certainly eager to install them.

To begin the project, I tore the car down for a rebuild. As one of my least maintained vehicles, the car was a mess of parking-lot soot and sand. I was pleased to see that the gearbox was still contaminant-free, and all its internals were still in good shape. For increased efficiency and to reduce maintenance, I reassembled the bare chassis and installed a full bearing kit: two 8x14mm bearings—part no. KYOC2217; 12, 5x10 bearings—KYOC2197.

My next mod was a wheel and tire swap. The Mantis comes equipped with hard front slicks that offer little grip and make the car understeer excessively. I installed a full set of Kyosho's High Grip Slicks (KYOC6250), which I glued up to silver "mesh" wheels (KYOC6531) from Kyosho's Nostalgic series of vehicles. The satin-finish wheels are a dressier look than the kit's original white, 5-spoke wheels. Although the new hoops would have

1. The DuraTrax Streak ESC proved to be a good match for the Mantis. The side of the vertically mounted Futaba® receiver is just visible in this shot.

2. Kyosho's High Grip Slicks and silver mesh wheels add a scale look to the car and increase its road-holding ability.

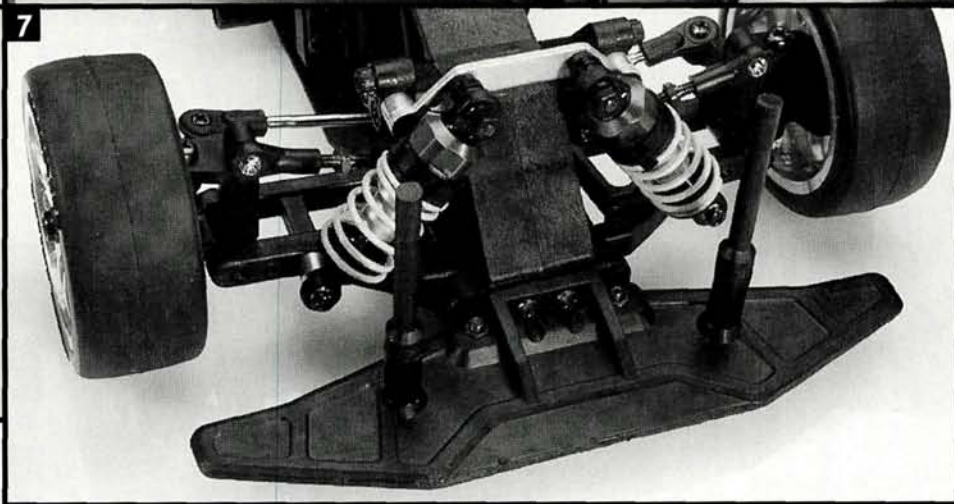
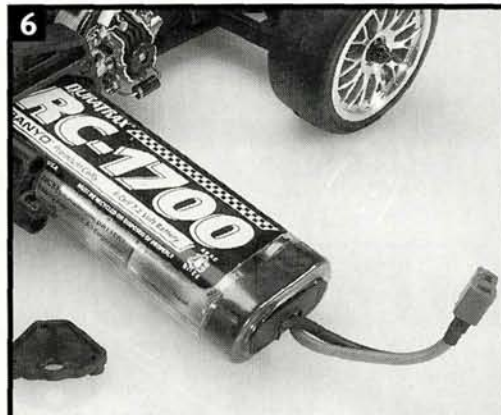
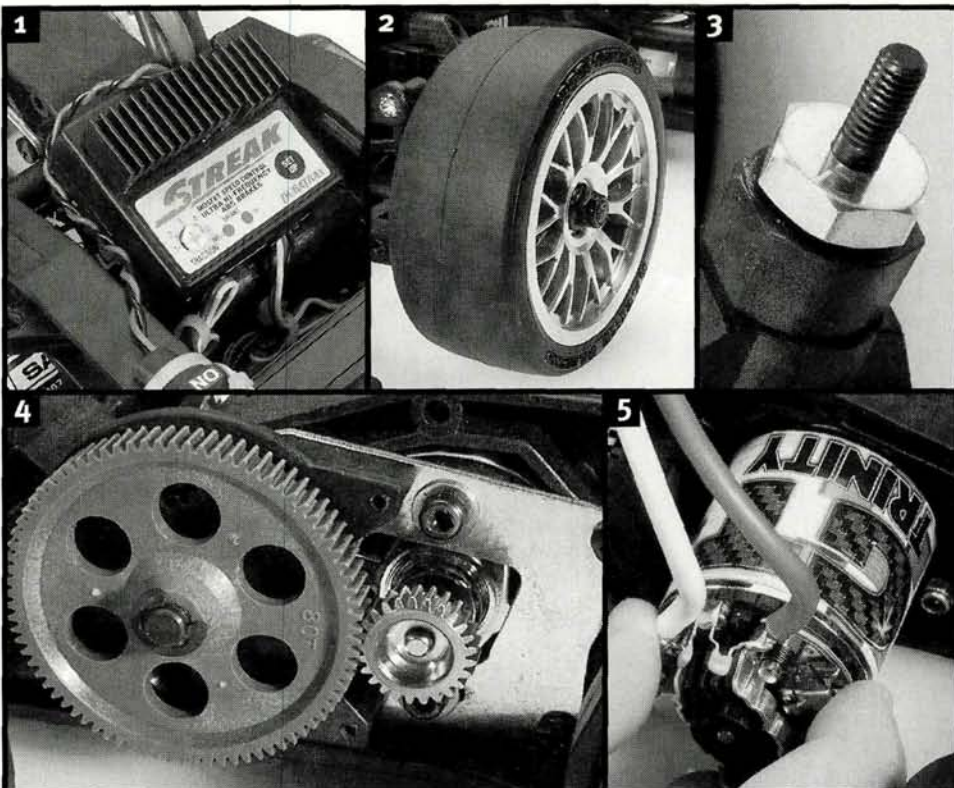
3. The optional universals don't accept the kit's crosspin and plastic hex. Instead, this optional aluminum drive washer is required.

4. A Robinson Racing pinion replaced the heavier stock unit and quieted the gear mesh. Although undergeared for a stock motor, the kit's original ratio is a good match for the Trinity GT-1 mod.

5. Trinity's 14-turn double GT-1 motor proved more than capable of delivering blistering performance.

6. DuraTrax RC-1700 packs were an ideal choice for the stick-pack-only Mantis. With plenty of punch and run time, they're great for play and practice.

7. The kit's wide front bumper was retained; although heavy, it offers better support of the body shell and ample protection against the occasional curb hit.



PARTS LIST

Part No.

DURATRAX

Streak ESCDTXM1030
RC-1700 battery packDTXC2070

ROBINSON

25-tooth pinionRRP1125

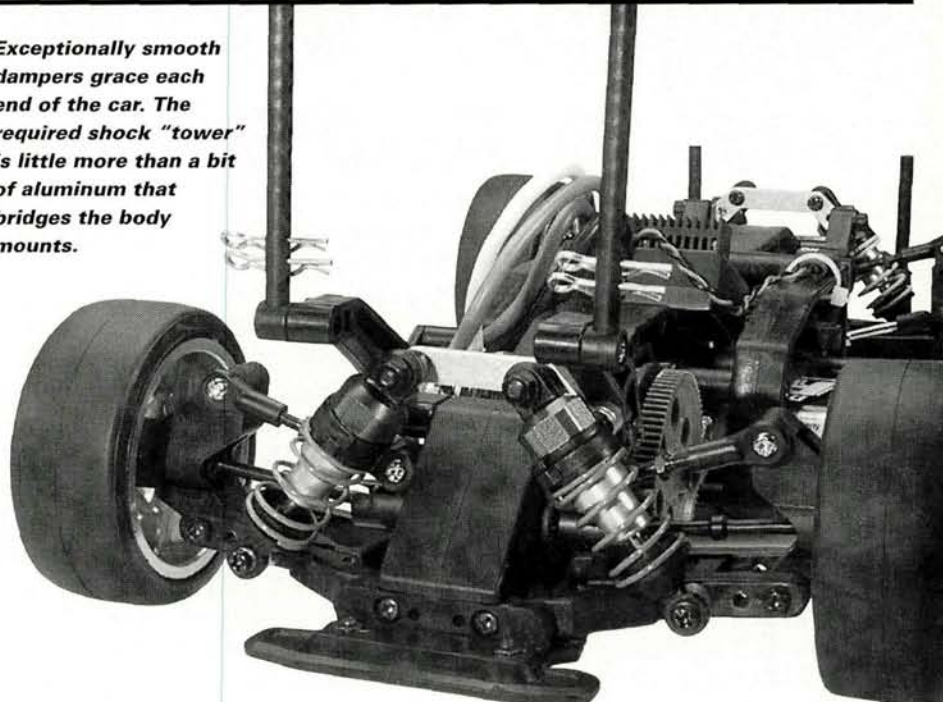
TRINITY

GT-1 14x2 motorGT1214
8x14mm ball bearings (2)KYOC2217
5x10mm ball bearings (12)KYOC2197

KYOSHO

High-Grip SlicksKYOC6250
Mesh wheelsKYOC6531
1998 Corvette bodyKYOC2101
Universal axlesKYOC6120
Drive washer for universalsKYOC3356
Touring shocksKYOC5753
Mantis shock staysKYOC5728
Turnbuckle kitKYOC5380
Aluminum pivot ballsKYOC2239

Exceptionally smooth dampers grace each end of the car. The required shock "tower" is little more than a bit of aluminum that bridges the body mounts.



been a good match for the Mantis Shelby Cobra body, my "Thrash Test" left the body—you guessed it—thrashed. I was impressed by the looks of Kyosho's 1998 Corvette body shell and ordered one for my Mantis (KYOC2101). Since Kyosho offers the Mantis with this body, I knew it would fit the chassis without a hitch. I was pleased to discover window masks included with the shell as well as factory-applied masking film—always a plus.

I wanted to have plenty of performance to match the looks of the 'Vette body, so I installed one of Trinity's* GT-1 machine-wound mods. The GT-1 line is aimed squarely at touring cars and features adjustable timing and ball bearings. I chose the 14 double version; hotter winds are offered, but the 2WD Mantis isn't well suited to the overkill approach. I also installed a new Robinson* pinion to replace the heavier stock unit.

To best take advantage of the hot motor, I installed Kyosho's universal axles—KYOC6120. These are a direct fit, but a special drive washer (KYOC3356) is required to replace the crosspin and plastic hex of the kit's dogbone setup. I picked up a couple of DuraTrax* RC-1700 packs to power the Trinity mill; these were a natural choice, as I also installed DuraTrax's new Streak high-frequency

ESC. This unit features ABS brakes, adjustable traction control and push-button setup. Best of all, it's inexpensive at less than \$70.

The Mantis's newfound muscle would be wasted if channeled through the stock, undamped suspension, so plush, oil-filled shocks were in order. Kyosho's aluminum-body touring shocks (KYOC5753) are among the best and were an easy fit with the addition of the required shock stays (KYOC5728). While I had the suspension dismantled, I also added Kyosho's turnbuckle kit (KYOC5380). The kit's original molded links provide good starting points for the wheels' camber settings, but the adjustability of the turnbuckle links is an invaluable tuning aid. To complete the installation of the links, I used the required aluminum pivot balls (KYOC2239). With that final mod, I was ready to test my revamped Mantis EP.

PERFORMANCE

I expected my modifications to completely erase any memory of the underpowered, understeering car that was the stock Mantis EP, and I was not disappointed. Even though my initial spring and shock oil choices weren't ideal, the "new" Mantis proved to be a precise handler.

Once I had nailed down the damper

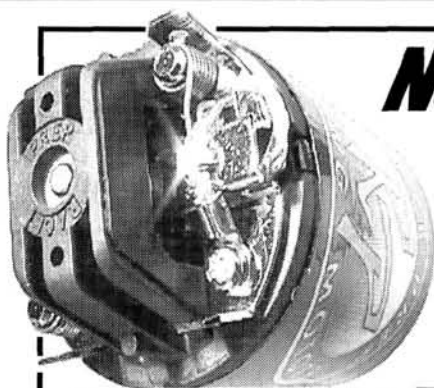
setup (80WT oil in the rear with Tamiya blue springs; 60WT oil up front with red springs), the Mantis handled like the best full-size 2WD cars—a little loose at the limits, but easy to reel in if you over-cook it.

Much of the credit for the improved handling goes to the soft slick tires, which far outclass the stock units. The new treads are sure to wear faster, but I'll have a lot more fun with them while they're around!

A ball differential would probably extend the car's performance envelope, but the no-maintenance gear diff scores high on my convenience list. The performance of the DuraTrax Streak ESC exceeded my expectations; in this issue, there's a "Product Watch" on the Streak with all the details, but suffice it to say, the Streak has the smooth feel of a big-dollar speedo.

As you might expect, Trinity's GT-1 powerplant and the Sanyo 1700 cells that make up the DuraTrax packs offered no surprises—just the usual reliable high performance. In hopped-up form, the Mantis retains the reliability and simplicity that make it an ideal beginners' car while it ups the performance level to racecar standards. I just wish there were a 2WD sedan class!

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.



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TRAXXAS NITRO SPORT

(Continued from page 82)

the EZ Start that much, because the engine runs so reliably; I just kept adding fuel, and the Nitro Sport kept running. I ran the truck on grass, cement, gravel and dirt. It seemed content on all the surfaces, but with little provocation, it showed a tendency to spin out. I also noticed that it wandered a little when getting off the gas. I'm sure that with a little tuning, however,

the Nitro Sport will handle admirably.

The TQ radio does not have steering dual rate or end-point adjustments, so chassis tuning is critical. Other than that, the truck was a lot of fun to drive and achieved impressive top speeds.

FINAL THOUGHTS

The Traxxas Nitro Sport is perhaps the most user-friendly nitro-powered stadium truck available. It may not be a hardcore

racing machine, but that isn't what it's intended for. It has the look and feel of a top contender, but it's an easy-to-start and easy-to-maintain sport-level vehicle.

The EZ Start starter performed flawlessly, as did the TRX 15 engine. I give the Nitro Sport the G-Man seal of approval and would confidently recommend it to all first-time gas R/C drivers.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.

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XXT, XXTCR	EDC-1011	EDC-1010

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BODY

Aluminum sheet was used to create the signature look of a drag rail. Nine pieces make up the main body, and three pieces make up the wing. The body pieces were formed over a wooden form then riveted together. Once completed, the body was polished with fine steel wool then sprayed with an automotive clearcoat to prevent oxidation.

Top Fuel

DRAGSTER

A Rail with detail

by Kevin Hetmanski

WHEN IT comes to single-purpose, pure-competition racing vehicles, it's hard to beat a top-fuel dragster for sheer power and brutish simplicity. Little more than a wheeled arrow strapped to a wildly powerful V8, the modern "rail" is a vision of motor racing in perhaps its purest state. Master modeler John Massotto recognized this and sought to bring his own drag vision to life in a scale R/C vehicle. His top-fuel dragster was scratch-built from plans that he designed. He drew on his 12 years of experience in R/C (as well as a lot of talent and creativity) to create the impressive machine featured on these pages.



REAR END

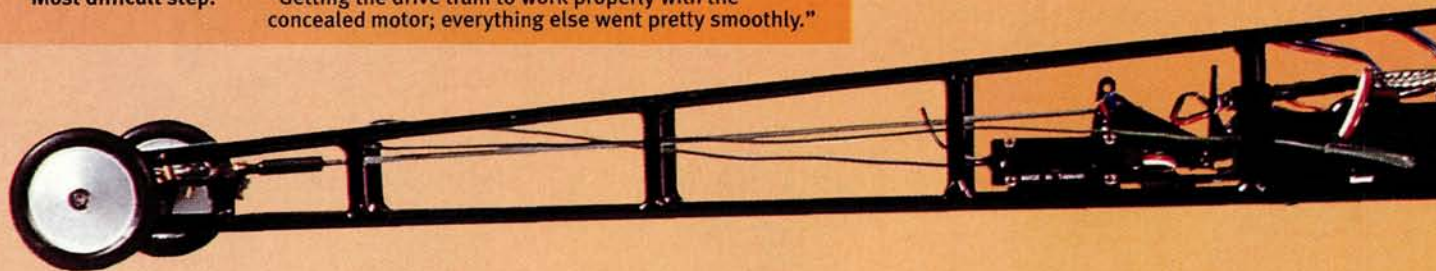
A conventional pan-car-type straight axle would hardly be scale, so John retrofitted a Tamiya* Mountaineer rear axle and differential assembly to the car. Thorp* hubs were used to attach Kyosho* F1 rims to the Mountaineer parts, while Twinn K foams provided suitably plump rear rubber. The rear 'chutes are sculpted from balsa wood(!) and covered in Monokote, while ovalized brass tubing supports the three-piece aluminum wing.

SPECS

Wheelbase:	27.25 in.
Track (F/R):	7/3.75 in.
Length overall:	33.5 in.
Weight:	2 lb., 9 oz.
Construction time:	about four months
Approximate cost:	\$50. "The raw materials are very inexpensive. It's all time."
Would sell for:	"I couldn't even tell you; I put in so much time, it's really priceless."
Most difficult step:	"Getting the drive train to work properly with the concealed motor; everything else went pretty smoothly."

CHASSIS

To replicate the chromoly-tube-frame chassis of a full-scale rail, John selected brass tube to create the framework of his R/C version. Working from photographs of the real deal, John made a scale drawing to use as a template to lay out the brass tube. Eighty-six individual pieces of 7/16-inch brass tube were painstakingly cut, bent and soldered to match the plans and then sprayed black—incredibly realistic.

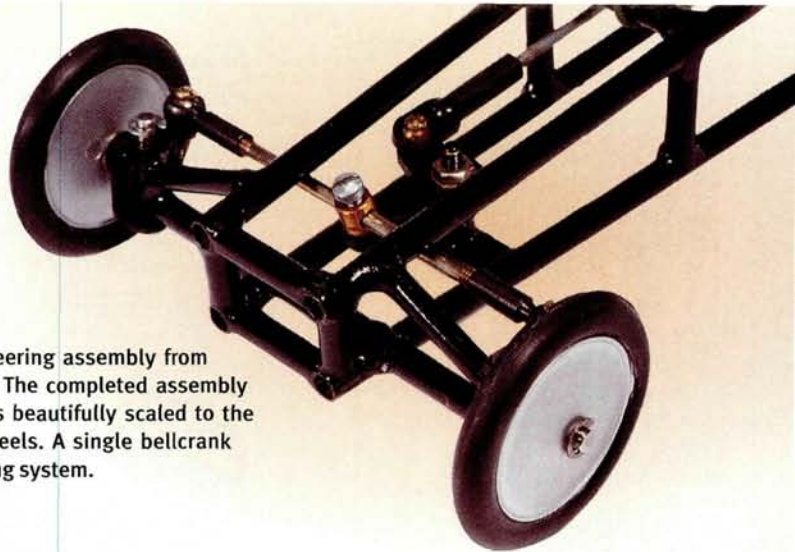


ENGINE

The awesome scale engine that sits between the chassis rails is actually a combination of two different Parma kits. The block is from a small-block Chevy kit, and the rest of the parts are from the 426 Hemi kit. The small block was used because it scaled well to the engines used on real dragsters. The engine is completely plumbed and wired, but John felt it needed an extra level of detail, so he dismantled a wind-up watch and used parts of its mechanism to create scale linkages for the carburetor. The braided "hose" that covers the wiring to the motor was stripped from coaxial cable—better known as cable TV wire!

STEERING

John made his custom-steering assembly from brass tube and flat stock. The completed assembly operates smoothly and is beautifully scaled to the airplane-type front wheels. A single bellcrank actuates the steering system.



DRIVE TRAIN

A universal joint links the rear axle to the scale Parma* engine, which cleverly conceals a Trinity* motor. Note the clamping hubs.

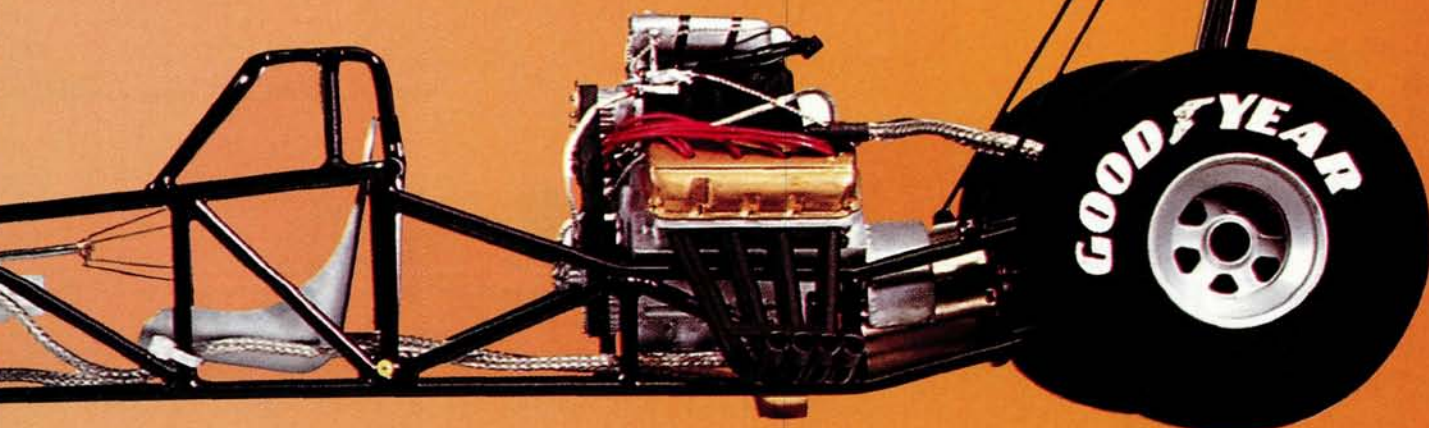


precisely shaped wing to the finely finished steering knuckles, John's machine is a testimonial to what patience and creativity can do. Great work!

**Addresses are listed alphabetically in the Index of Manufacturers on page 201.*



It only takes a passing glance to recognize that John Massotto's dragster is truly a piece of rolling artwork, but few are satisfied with merely a passing glance; the craftsmanship of this scale rail demands a long look-see to fully appreciate all the hard work that went into its creation. From the



(Continued from page 128)

his Maxtec-powered Yokomo MX-4 into first place on lap one and never looked back. The battle was for second, as TQ Chris Bing and sixth qualifier Scott Brown ran neck and neck with their XX-4s throughout the four minutes. By lap seven, Chris held the second spot, and he held off his Losi

teammate until the finish. Scott settled for third, while perennial four-wheel contender Rick Hohwart rolled his XX-4 into fourth.

• **Round 2.** This belonged to Barry Baker's Yokomo—again. From go, Barry kept his MX-4 in first place, while TQ Chris Bing lay in wait with his XX-4. Jimmy Jacobsen's Losi four-wheeler held on to third but his car could be heard making some scary baseball-card-in-the-bicycle-spokes noises. Mechanical problems notwithstanding, Jimmy hung on to third for half the race until Schumacher's Teemu Leino jumped from sixth to third in a single lap. Chris Bing's XX-4 looked as if it had the stuff to get past Baker, until Bing rolled his car over a pipe with less than a minute to go. Although he didn't lose position, Bing's mistake gave Baker a much more comfortable lead.

Barry Baker's second win gave him the 4WD Mod title, and Chris Bing and Teemu Leino earned second- and third-place points on their way to the final round.

• **Final round.** Barry Baker sat out the final Main but took the mike to do the announcing duties. At the tone, TQ Chris Bing jumped to a commanding lead followed by Jimmy Jacobsen and Jukka Steenari. Matt Francis had a great start and jumped into fourth from his eighth-place starting position.

The action got interesting three laps into the race when Bing rolled his XX-4 over a pipe, handing the lead to Jimmy Jacobsen and moving Jukka up to second place in the process. After leading two laps, bad luck also struck Jacobsen, as an endo landed his car on its roof and allowed Jukka to move into first. Chris Bing held the second spot, while Jimmy's misfortune bumped him back to fifth.

Masami battled from sixth to third, but succumbed to Scott Brown's XX-4 with about a minute left on the clock. Chris

Bing finished in second, and Jukka Steenari took the win.

With this final Main in the can, Scott Brown took third overall, TQ Chris Bing settled for second, and Barry Baker went home with the first-place trophy.

WINTERCHAMPS WRAP-UP

Losi, Trinity and the Francis brothers were the big winners here, as Mark and Matt dominated Mod Truck and Mod Buggy with their D3-powered XX-series machines. Barry Baker went home happy with a big win for Yokomo and Maxtec, and new face Jason Conley made the first of what he hopes will be more national podium finishes (preferably with a factory ride!).

The biggest victory of the weekend was not that of any racer, however, but the victory of man over nature; in a plot worthy of a Jack London story, a lot of hard work made the Winterchamps happen when all seemed lost. One man, however, was pointed out to me as the one who really got things done: Stan Wooten. Stan coordinated the efforts of the Lake Park rangers to make the Winterchamps happen. Without Stan and his team, this race would have been an R/C boat event.

Sam Ledford and Dave Fox were also singled out for thanks by many racers. In addition to running an efficient tech row, Sam and Dave (no relation to the R&B duo) showed their sporting spirit by making their club track (Minnreg R/C Club) in nearby Clearwater available to any racers who wanted extra practice while the Lake Park track was under water. They didn't charge a cent, and racers got valuable trigger time.

Of course, Eric Kirby and the West Coast R/C Club must be thanked for the fine show they put on, and Team Losi is thanked for their generous support.

Here's to a great event! See you next year.

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Trick Track Awards

OK; here are two more of those "R/C men of action" that make me so proud: Tim Mackersy of Dunedin, New Zealand, and Andrew Silvers of Long Valley, NJ—true non-whiners who do something about their situation, that being a lack of a track.

You don't see guys like these holding "I have no place to race" pity parties. Instead, they took matters into their own hands and now, both have a place to race without spending a dime. A free, one-year subscription to R/C Car Action is on its way to both of you for being an inspiration to others.

Tim Mackersy and his R/C mate Nick Leach were tired of driving up and down the driveway and decided to convert the "back garden" (that's what New Zealanders call a backyard, I suppose) into a small off-road circuit. As Tim puts it, "We started with no jumps or ditches" [ditches?—another New Zealand thing, I guess] "and sprinkled dry dirt on the track for power-sliding through turns. Then we added one big jump, two small ones and a ditch on the back straight. Now we have a track we really like. Building it took about three days—well worth the effort!"

Congratulations, guys, and beware of those Australian Road Warrior types who might at this very moment be paddling across the Tasmanian Sea (I know, I know ... it's Tasman Sea) wanting to race on your track. They feel playing dirty is part of off-roading.



Tim Mackersy
Dunedin,
New Zealand



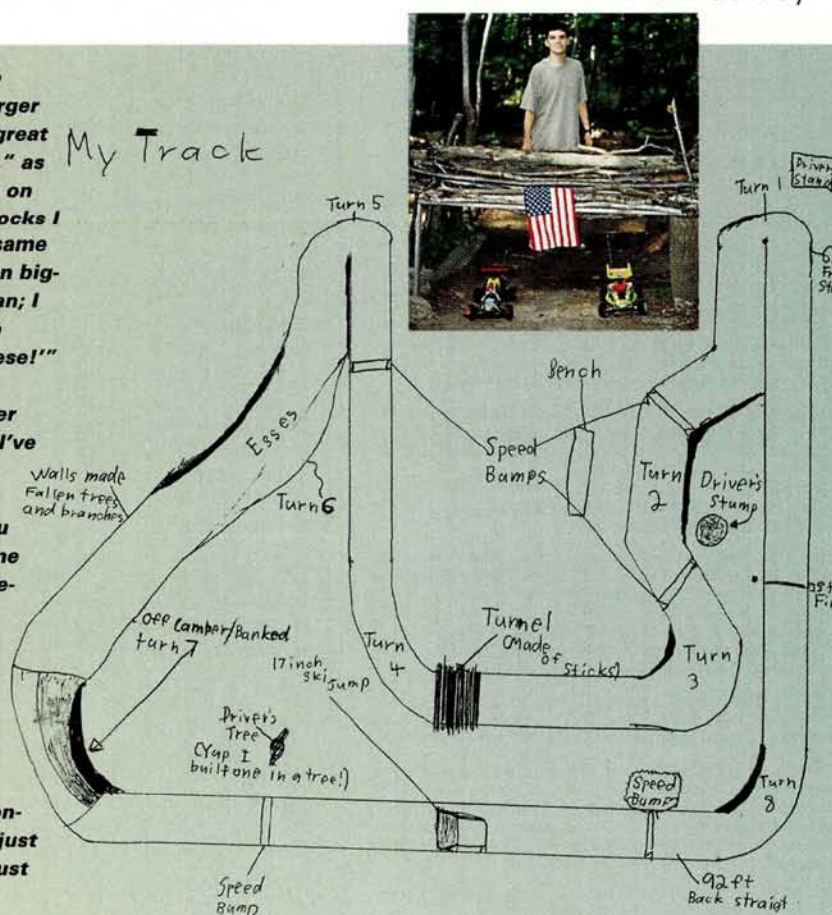
Andrew Silvers,
Long Valley,
New Jersey

Andrew, who says he was raised on R/C Car Action, also got sick of driving up and down his dead-end street; so he picked up a rake and went to work on his backyard (which looks

a time to make the track larger and larger until he had "... a great little place to race," as he puts it. He goes on to say, "With the rocks I dug up, some the same weight as me—even bigger—I thought, 'Man; I could make a huge jump base with these!'" And so he did.

He ends his letter saying, "All in all, I've had a blast creating this track. Maybe some of you R/C nuts could come here and race sometime. I'd love it." While Andrew was nice enough to supply this layout drawing for us, he didn't have it ahead of time to use as a construction plan. He just went at it alone—just him and his rake!

My Track



more like a forest to me). Under all the leaves, he found dirt that was perfect for an off-road track. Andrew and his rake kept working through the months, removing a few rocks at